WARNINGS AND PRECAUTIONS FOR SAFETY

Please observe the following safety precautions in order to use safely and correctly the refrigerator and to prevent accident and danger during repair.

1. Be care of an electric shock. Disconnect power cord from wall outlet and wait for more than three minutes before replacing PWB parts. Shut off the power whenever replacing and repairing electric components.

2. When connecting power cord, please wait for more than five minutes after power cord was disconnected from the wall outlet.

3. Please check if the power plug is pressed down by the refrigerator against the wall. If the power plug was damaged, it may cause fire or electric shock.

4. If the wall outlet is over loaded, it may cause fire. Please use its own individual electrical outlet for the refrigerator.

5. Please make sure the outlet is properly earthed, particularly in wet or damp area.

6. Use standard electrical components when replacing them.

7. Make sure the hook is correctly engaged.
   Remove dust and foreign materials from the housing and connecting parts.

8. Do not fray, damage, machine, heavily bend, pull out, or twist the power cord.

9. Please check the evidence of moisture intrusion in the electrical components. Replace the parts or mask it with insulation tapes if moisture intrusion was confirmed.

10. Do not touch the icemaker with hands or tools to confirm the operation of geared motor.

11. Do not let the customers repair, disassemble, and reconstruct the refrigerator for themselves. It may cause accident, electric shock, or fire.

12. Do not store flammable materials such as ether, benzene, alcohol, chemicals, gas, or medicine in the refrigerator.

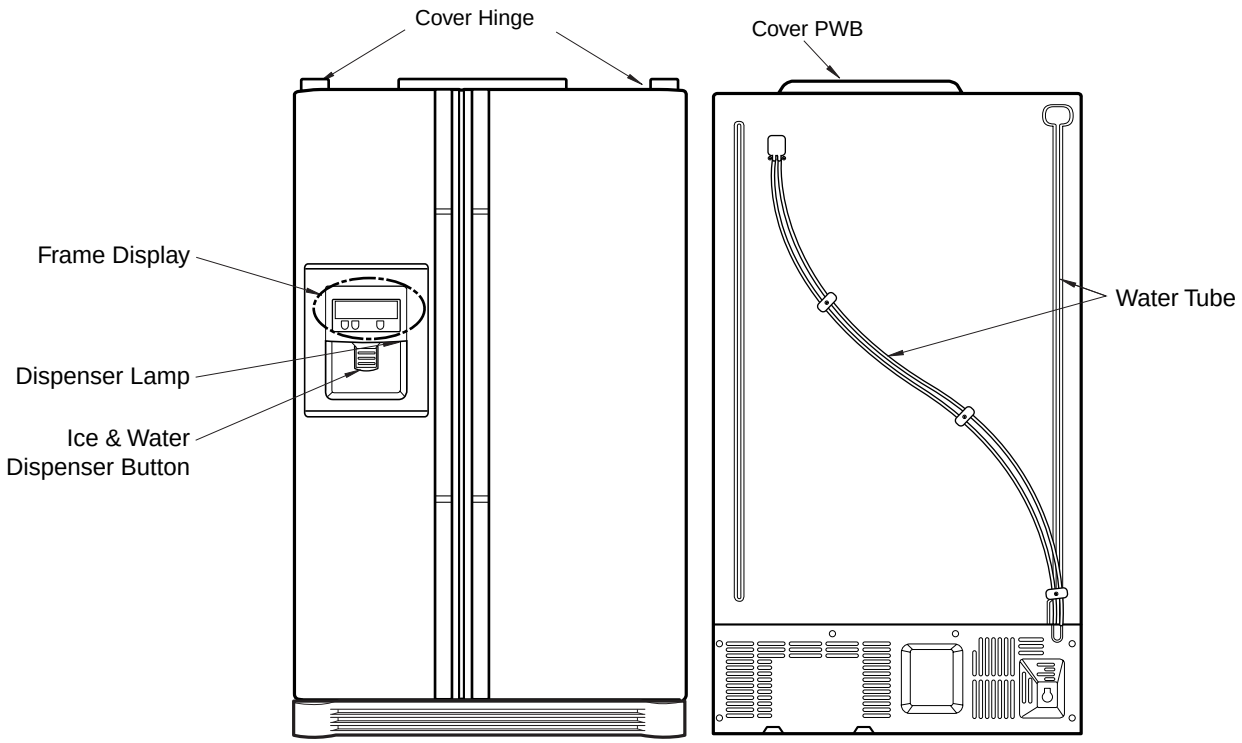
13. Do not put flower vase, cup, cosmetics, chemicals, etc., or container with full of water on the top of the refrigerator.

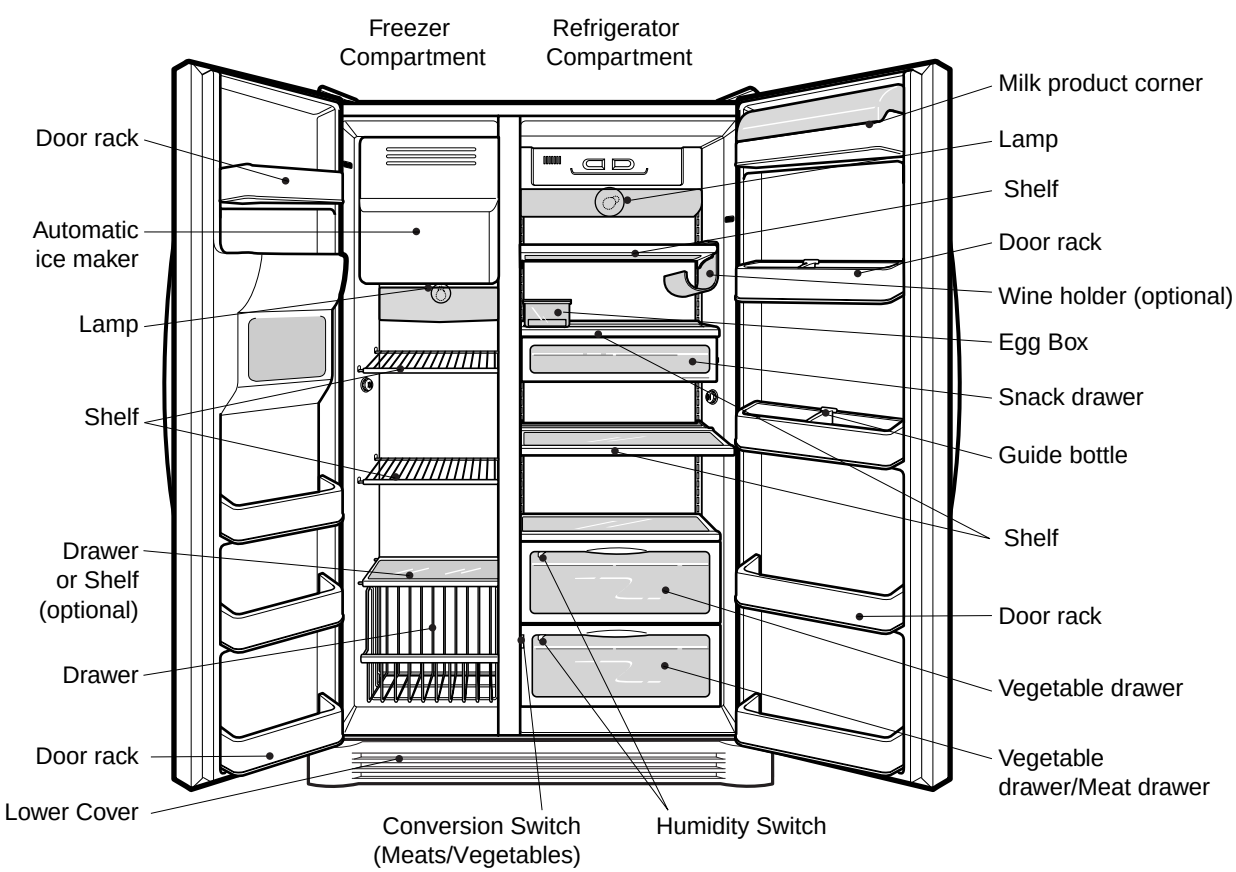
14. Do not put glass bottles with full of water into the freezer. The contents shall freeze and break the glass bottles.

15. When you scrap the refrigerator, please disconnect the door gasket first and scrap it where children are not accessible.

PARTS IDENTIFICATION

3. Ref No. : GR-L247ER, GR-L207ER





2-8. Odor

Problems	Causes	Checks	Measures	Remarks
Food Odor.	Food (garlic, kimchi, etc)	- Check the food is not wrapped. - Check the shelves or inner wall are stained with food juice. - Check the food in the vinyl wraps. - Chedk food cleanliness.	- Dry deodorizer in the shiny and windy place. - Store the food in the closed container instead of vinyl wraps. - Clean the refrigerator and set button at "strong".	
Plastic Odor.	Odors of mixed food and plastic odors.	- Check wet food is wrapped with plastic bowl and bag. - It happens in the new refrigerator.	- Clean the refrigerator. - Persuade customers not to use plastic bag or wraps with wet food or odorous foods.	
Odor from the deodorizer.	Odor from the old deodorizer.	- Check the deodorizer odors.	- Dry the deodorizer with dryer and then in the shiny and windy place. - Remove and replace the deodorants.	*Deodorizer : option

2-9. Micom

Problems	Symptom	Causes		Checks	Measures	Remarks
Bad PCB electric power.	All display LEDS are off.	Bad connection between Main PCB and display circuit.	Bad connector connection from main PCB to display PCB.	Visual check on connector connection.	Reconnect connector.	
		Defective PCB trans.	PCB Trans winding is cut.	Check resistance of PCB Trans input and output terminals with a tester. (If resistance is infinity, trans winding is cut).	Replace PCB Trans or PCB.	Applicable to model without dispenser.
			PCB Trans temperature fuse is burnt out.			
		DefectivePCB electric circuit parts.	Defective regulator IC (7812, 7805).	Check voltage at input/output terminals.	Replace regulator.	Refer to electric circuit in circuit explanation.
			PCB electric terminal fuse is burnt out.	Check fuse in PCB electric terminal with a tester.	Replace PCB fuse.	
			STR Parts are damaged.	Check if STR No. 2 and 3 pins are cut when power is off.	Replace parts.	Applicable to model with dispenser.
	Abnormal display LED operation	Bad connection between Main PCB and display circuit.	Lead Wire connecting main PCB and display PCB is cut or connector terminal connection is bad.	Check Lead Wire terminals connecting Main PCB and display PCB with a tester.	Reconnect Lead Wire and directly connect defective contact terminal to Lead Wire.	
		Defective LED module.	Defective LED.	Check if all LEDs are on when Main PCB Test switch is pressed (or when both freezer key and power freezer key are pressed at the same time for more than one second.)	Replace display PCB.	Refer to display circuit in circuit explanation.

Problems	Symptom	Causes		Checks	Measures	Remarks
Bad cooling.	Freezer temperature is high.	Compressor does not start.	Compressor Lead Wire is cut.	Check compressor Lead Wire with a tester.	Reconnect Lead Wire.	
			Defective compressor driving relay.	Measure voltage at PCB CON5 (3&9) after pressing main PCB test switch once. It is OK if voltage is normal.	Replace relay(RY1 and RY14) or PCB.	Refer to load driving circuit in circuit explanation.
		Defective freezer sensor.	Defective Freezer sensor parts.	Check resistance of freezer sensor with a tester.	Replace freezer sensor.	Refer to resistance characteristics table of sensor in circuit
			Freezer sensor is substituted for other sensor.	Confirm the color of sensor in circuits (main PCB sensor housing).	Repair main PCB sensor housing	explanation.
		Defective freezer fan motor.	Fan motor lead wire is cut.	Check fan motor lead wire with a tester.	Reconnect lead wire.	
			• Defective door switch (freezer, refrigerator, home bar). • Defective fan motor. • Defective fan motor driving relay.	Measure the voltage between PCB power blue line and fan motor after pressing test switch of Main PCB. If the voltage is normal, it is OK.	• Replace door switch (freezer, refrigerator and home bar). • Replace fan motor. • Replace relay(RY5 & RY6) or PCB.	Refer to load driving circuits in circuit explanation.
		Faulty defrost.		Refer to faulty defrost items in trouble diagnosis functions.		Refer to trouble diagnosis function.

Problems	Symptom	Causes		Checks	Measures	Remarks
Bad cooling	Wrong Refrigerator temperature.	Defective AC Damper.	Check AC damper motor and reed switch and lead wire are cut.	Check if AC damper motor and reed switch lead wire are cut with a tester.	Reconnect lead wire.	
			Check AC damper part.	Refer to AC damper in parts repair guide.	Replace AC damper or refrigerator control box Assy.	
			Check AC damper Motor driving relay in PCB.	Refer to AC damper in parts repair guide.	Replace relay or PCB.	Refer to single motor damper driving circuits in circuit explanation.
			Foreign materials in AC damper baffles	Check AC damper baffle visually.	Remove foreign materials.	
			Ice formation on AC damper baffles	Check if AC damper Heater wire is cut with a tester.	Replace AC damper or refrigerator control Box Assy.	
		Defective refrigerator sensor	Defective refrigerator sensor parts.	Check the resistance of refrigerator sensor with a tester.	Replace refrigerator sensor.	Refer to sensor resistance characteristic table in circuit explanation.
			Refrigerator sensor is substituted for other sensor.	Check the sensor color in the circuit. (main PCB sensor housing.)	Repair main PCB sensor housing.	
			Defective refrigerator sensor assembly condition.	Check if refrigerator sensor is not fixed at cover sensor but inner case visually.	Fix again the refrigerator sensor.	

Problems	Symptom	Causes	Checks	Measures	Remarks
Bad defrost.	Defrost is not working.	Defrost lead wire is cut.	Check if defrost lead wire is cut with a tester.	Reconnect Lead Wire.	
		Defective defrost driving relay.	Check the voltage of CON5 (1 and 7) with a tester after pressing main PCB test switch twice. If the voltage is normal then it is OK.	Replace relay (RY 7 and RY 14) or PCB.	Refer to load driving conditions check in circuit explanation.
		Defective defrost sensor parts.	Check the resistance of defrost sensor with a tester.	Replace defrost sensor.	Refer to sensor resistance characteristic table of circuit explanation.
Defective buzzer	Buzzer continuously rings or door opening alarm does not work.	Defective connecting lead wire from main PCB to door switch.	Check lead wire related to door switch with a tester.	Repair lead wire.	
		Defective door switch parts.	Refer to door switch in parts repair guide.	Replace door switch.	
Defective display button	Buzzer does not ring and key does not sense even button is pressed.	Key input wire is cut or bad connector terminal contact in main PCB and display PCB connecting lead wire.	Check input wire with a tester.	Reconnect lead wire and replace or directly connect bad contact terminal to lead wire.	Refer to display circuit in circuit explanation.
		Key is continuously depressed due to structural interference.	Disassemble frame display and confirm visually.	Adjust or replace interfering structures.	

Problems	Symptom	Causes	Checks	Measures	Remarks
Defective display button.	Buzzer rings but key does not sense even button is pressed.	Trouble mode indication.	Check trouble diagnosis function.	Repair troubles	Refer to mode indication in function explanations.
Door Buzzer	Buzzer continuously rings or door opening alarm does not work.	Defective connecting lead wire from main PCB to door switch.	Check lead wire associated with door switch.	Repair lead wire.	Check model with dispenser.
		Defective freezer compartment door switch parts.	Refer to door switch in parts repair guide.	Replace Freezer compartment door switch.	
Bad water/ice dispenser.	Ice and water are not dispensed.	Defective connecting lead wire from Main PCB to lever switch.	Check Lead Wire associated with lever switch with a tester.	Repair lead wire.	
		Defective lever switch parts	Refer to door switch in parts repair guide.	Replace lever switch.	
		Defective photo coupler IC parts.	Check voltage change at photo coupler output terminals with lever switch pressed. It is OK if voltage change is between 0V - 5V.	Replace photo coupler IC or PCB.	
		Defective relay associated with ice dispense (geared motor, cube and dispenser solenoid).	Check relay (RY9, RY11, RY12) with a tester.	Replace defective relay.	
		Defective parts associated with ice dispense (geared motor, cube and dispenser solenoid).	Check resistance of parts with a tester.	Replace defective parts.	
		Defective relay associated with water dispense.	Check relay (RY10) with a tester	Replace defective relay.	
		Defective parts associated with water dispenser.	Check resistance of parts with a tester.	Replace defective parts.	

TROUBLE DIAGNOSIS

3. Cooling Cycle Heavy Repair

3-1. The Heavy Repair Standards for Refrigerator with R134a Refrigerant

NO.	Items		Unit	Standards	Purposes	Remarks
1	Pipe and piping system opening time.		Min.	Pipe:within 1 hour. Comp:within 10 minutes. Drier:within 20 minutes.	To protect Moisture Penetration.	The opening time should be reduced to a half of the standards during rain and rainy seasons (the penetration of water into the pipe is dangerous).
2	Welding.		Nitrogen Pressure.	Weld under Nitrogen atmosphere (N_2 pressure: 0.1~0.2 kg/cm^2)	To protect oxide scale formation.	- Refet to repair note in each part. - R134a refrigerant is more susceptible to leaks than R12 and requires more care during welding. - Do not apply force to pipes before and after welding to protect pipe from cracking.
3	N_2 sealed parts.		Confirm N_2 leak.	Confirm air leaking sounds when removing rubber cap. Sound:usable No sound:not usable	To protect moisture penetration.	- In case of evaporator parts, if it doesn't noise when removing rubber cap blow dry air or N_2 gas for more than 1 min use the parts.
4	Refrigeration Cycle.	Evacuation time	Min.	More than 40 minutes.	To remove moisture.	
		Vacuum degree	Torr	Below 0.03(ref)		Note:Only applicable to the model equipped with reverse flow protect plate.
		Vacuum	EA	High and low Pressure sides are evacuated at the same time for models above 200ℓ		Vaccum efficiency can be improved by operating compressor during evacuation.
		Vacuum piping	EA	Use R134a exclusive manifold.	To protect mixing of mineral and ester oils.	The rubber pipes for R12 refrigerant shall be melted when they are used for R134a refrigerant(causes of leak).
		Pipe coupler	EA	Use R134a cxclusive.	To protect R12 Refrigerant mixing.	
		Outlet (Socket)		R134a exclusive.	〃	
		Plug		R134a exclusive	〃	
5	Refrigerant weighing.		EA	Use R134a exclusively. Weighing allowance:±5g Note:Winter:-5g Summer:+5g	Do not mix with R12 refrigerant.	- Do not weight the refrigerant at too hot or too cold an area.(25°C is adequate.) - Use copper bombe Socket:2SV Plug: 2PV R134a Note:Do not burn O-ring (rubber) during welding.
6	Drier replacement.			-Use R134a exclusively for R134a refrigerator -Use R12 exclusively for R12 refrigerator -Replace drier whenever repairing refrigerator cycle piping.	To remove the moisture from pipe.	
7	Leak check.			-Do not use soapy water for check. it may be sucked into the pipe by.	Detect refrigerant leak area.	-Check oil leak at refrigerant leak area. Use electronic leak detector if oil leak is not found. -The electronic leak detector is very sensitive to halogen gas in the air. It also can detect R141b in urethane. Please practice, therfore, many times before use.

NOTE) Please contact Songso company on +82-53-554-2067 if you have inquiry on heavy repair special facility.

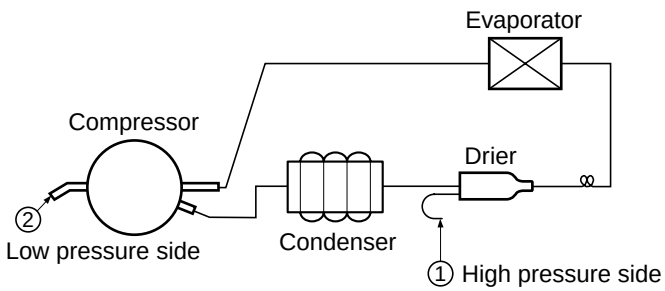
TROUBLE DIAGNOSIS

3-2. Summary Of Heavy Repair

Process	Contents	Tools
Trouble diagnosis		
Remove refrigerant Residuals	- Cut charging pipe ends and discharge refrigerant from drier and compressor.	Filter, side cutters
Parts replacement and welding	- Use R134a oil and refrigerant for compressor and drier - Confirm N_2 sealing and packing conditions before use. Use good one for welding and assembly. - Weld under nitrogen gas atmosphere.(N_2 gas pressure: 0.1-0.2kg/cm^2). - Repair in a clean and dry place.	Pipe Cutter, Gas welder, N_2 gas
Vacuum	- Evacuate for more than forty minutes after connecting manifold gauge hose and vacuum pump to high (drier) and low (compressor refrigerant discharging parts) pressure sides. - Evacuation Speed:113//min.	Vacuum pump(R134a exclusively), Manifold gauge.
Refrigerant charging and charging inlet welding	- Weigh and control the allowance of R134a bombe in a vacuum conditions to be ±5 g with electronic scales and charge through compressor inlet (Charge while refrigerator operates). - Weld carefully after inlet pinching.	R134a exclusive bombe(mass cylinder), refrigerant(R134a) manifold gauge, electronic scales, punching off flier, gas welding machine
Check refrigerant leak and cooling capacity	- Check leak at weld joints. Minute leak: Use electronic leak detector Big leak: Check visually or fingers. Note:Do not use soapy water for check. - Check cooling capacity ① Check radiator manually to see if warm. ② Check hot line pipe manually to see if warm. ③ Check frost formation on the whole surface of the evaporator.	Electronic Leak Detector, Driver(Ruler).
Compressor compartment and tools arrangement	- Remove flux from the silver weld joints with soft brush or wet rag.(Flux may be the cause of corrosion and leaks.) - Clean R134a exclusive tools and store them in a clean tool box or in their place.	Copper brush, Rag, Tool box
Transportation and installation	- Installation should be conducted in accordance with the standard installation procedure.(Leave space of more than 5 cm from the wall for compressor compartment cooling fan mounted model.)	

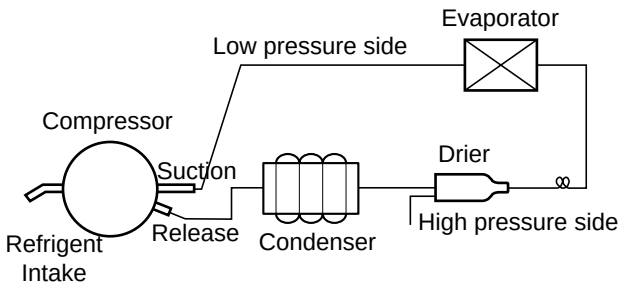
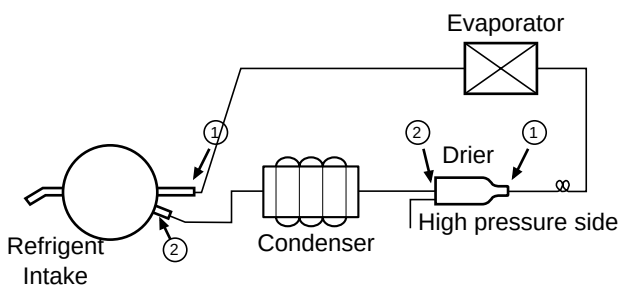
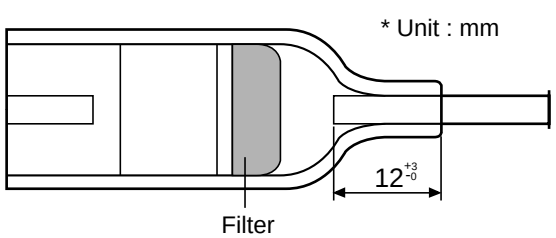
TROUBLE DIAGNOSIS

3-3. Precautions During Heavy Repair

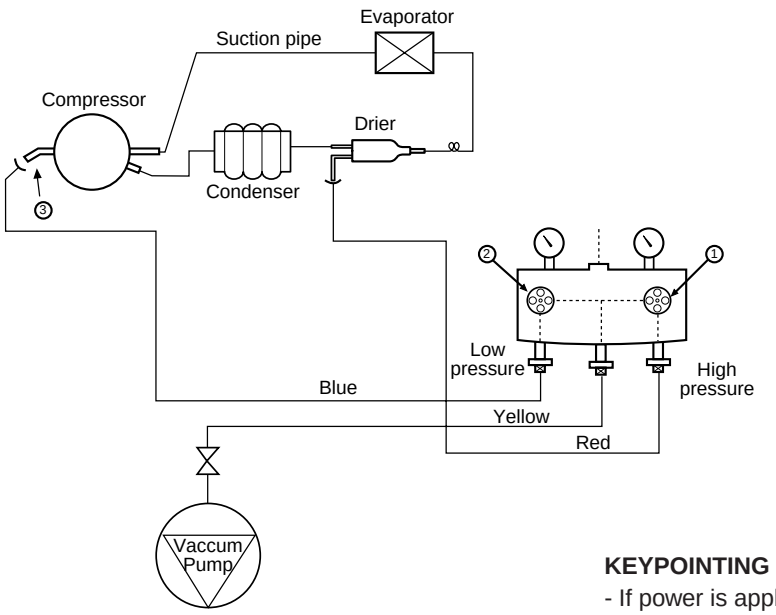
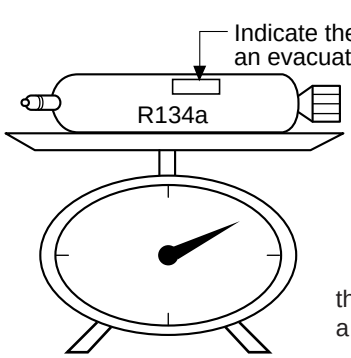
Items	Precautions
1. Use of tools.	1) Use special parts and tools for R134a.
2. Removal of retained refrigerant.	1) Remove retained refrigerant more than 5 minutes after turning off a refrigerator. (If not, oil will leak inside.) 2) Remove retained refrigerant by cutting first high pressure side (drier part) with a nipper and then cut low pressure side. (If the order is not observed, oil leak will happen.) 
3. Replacement of drier.	1) Be sure to replace drier with R134a only when repairing pipes and injecting refrigerant.
4. Nitrogen blowing welding.	1) Weld under nitrogen atmosphere in order to prevent oxidation inside a pipe. (Nitrogen pressure : 0.1~0.2 kg/cm^2.)
5. Others.	1) Nitrogen or refrigerant R134a only should be used when cleaning inside of cycle pipes inside and sealing. 2) Check leakage with an electronic leakage tester. 3) Be sure to use a pipe cutter when cutting pipes. 4) Be careful not the water let intrude into the inside of the cycle.

TROUBLE DIAGNOSIS

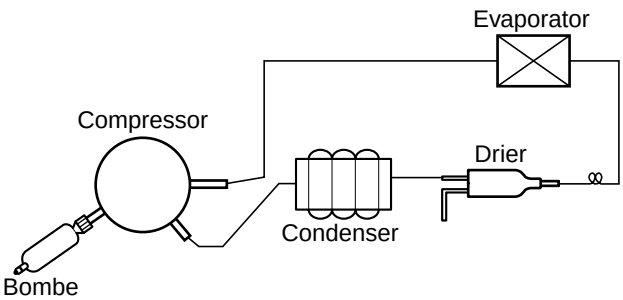
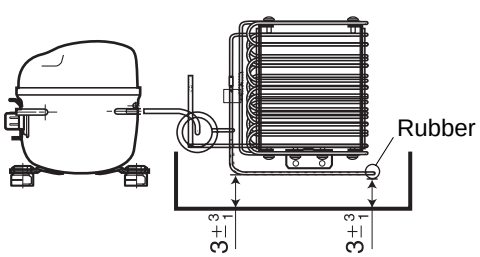
3-4. Practical Work For Heavy Repair

Items	Precautions
1. Removal of residual refrigerant.	 **KEYPOINTING** Observe the sequence for removal of refrigerant. (If not, compressor oil may leak.) 1) Remove residual refrigerant more than 5 minutes later after turning off the refrigerator. (If not, compressor oil may leak inside.) 2) Remove retained refrigerant slowly by cutting first high pressure side (drier part) with a nipper and then cut low pressure side.
2. Nitrogen blowing welding.	 **KEYPOINTING** Welding without nitrogen blowing produces oxidized scales inside a pipe, which affect on performance and reliability of a product. **When replacing a drier:** Weld ① and ② parts by blowing nitrogen(0.1~0.2kg/cm^2) to high pressure side after assembling a drier. **When replacing a compressor:** Weld ① and ② parts by blowing nitrogen to the low pressure side. Note) For other parts, nitrogen blowing is not necessary because it does not produce oxidized scales inside pipe because of its short welding time.
3. Replacement of drier.	 **KEYPOINTING** Be sure to check the inserted length of capillary tube when it is inserted. (If too much inserted, a capillary tube is clogged by a filter.) **Inserting a capillary tube** Measure distance with a ruler and put a mark($12^{+3/-0}$)on the capillary tube. Insert tube to the mark, and weld it

TROUBLE DIAGNOSIS

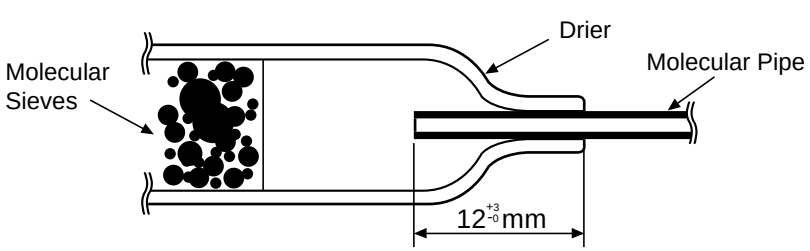
Items	Precautions
4.Vacuum degassing.	 **Pipe Connection** Connect a red hose to the high pressure side and a blue hose to the low pressure side. **Vacuum Sequence** Open ①, ② valves and evacuate for 40 minutes. Close valve ①. **KEYPOINTING** - If power is applied during vacuum degassing, vacuum degassing shall be more effective. - Operate compressor while charging refrigerant. (It is easier and more certain to do like this.)
5.Refrigerant charging.	**Charging sequence** 1) Check the amount of refrigerant supplied to each model after completing vacuum degassing. 2) Evacuate bombe with a vacuum pump. 3) Measure the amount of refrigerant charged. - Measure the weight of an evacuated bombe with an electronic scale. - Charge refrigerant into a bombe and measure the weight. Calculate the weight of refrigerant charged into the bombe by subtracting the weight of an evacuated bombe.  **KEYPOINTING** - Be sure to charge the refrigerant at around 25°C. - Be sure to keep -5g in the winer and +5g in summer **Calculation of amount of refrigerant charged** the amount of refrigerant charged= a weight after charging - a weight before charging (a weight of an evacuated cylinder)

TROUBLE DIAGNOSIS

Items	Precautions
	 4) Refrigerant Charging Charge refrigerant while operating a compressor as shown above. 5) Pinch a charging pipe with a pinch-off plier after completion of charging. 6) Braze the end of a pinched charging pipe with copper brazer and take a gas leakage test on the welded parts.
6. Gas-leakage test	* Take a leakage test on the welded or suspicious area with an electronic leakage tester.
7. Pipe arrangement in each cycle	Check each pipe is placed in its original place before closing a cover back-M/C after completion of work. Particularly control the size of Joint Drain Pipe 

3-5. Standard Regulations For Heavy Repair

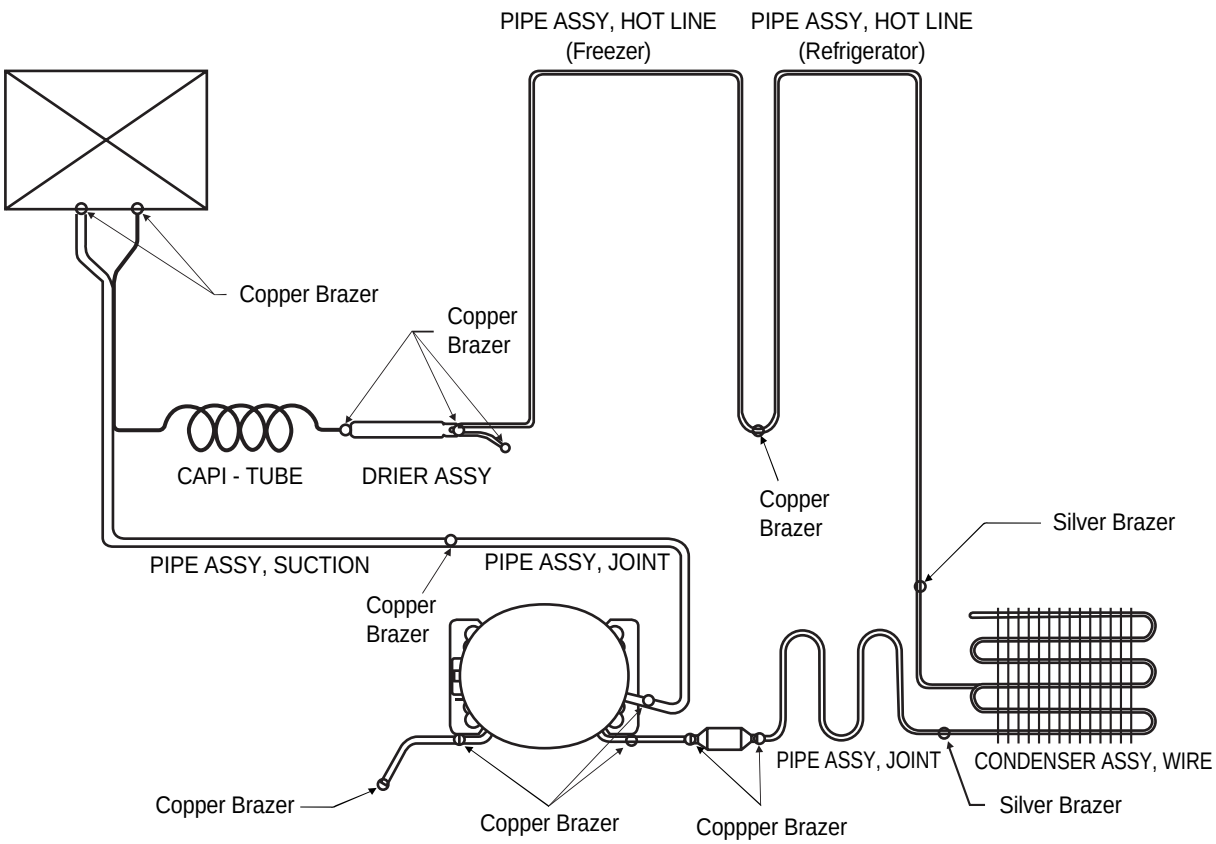
1) Observe the safety precautions for gas handling.
2) Use JIG (or wet towel) in order to prevent electric wires from burning during welding. (In order to prevent insulation break and accident.)
3) The inner case shall be melted and insulation material (polyurethane) shall be burnt if not cared during welding inner case parts.
4) The copper pipe shall be oxidized by overheating if not cared during welding.
5) Not allow the aluminum pipes to contact to copper pipes. (In order to prevent corrosion.)
6) Observe that the inserted length of a capillary tube into a drier should be 12^{+3}_{-0} mm.



7) Make sure that the inner diameter should not be distorted while cutting a capillary tube.
8) Be sure that a suction pipe and a filling tube should not be substituted each other during welding. (High efficiency pump.)

TROUBLE DIAGNOSIS

3-6. Brazing Reference Drawings



TROUBLE DIAGNOSIS

4. HOW TO DEAL WITH CLAIMS

4-1. Sound

Problems	Checks and Measures
"Whizz" sounds	■ **Explain general principles of sounds.** • All refrigerator when functioning properly have normal operating sound. The compressor and fan produce sounds. There is a fan in the freezer compartment which blows cool air to freezer and refrigerator compartments. "Whizz" sounds are heard when the air passes through the narrow holes into the freezer and refrigerator compartments. ■ **Cooling Fan sound in the compressor compartment.** • There is a fan on the back of the refrigerator, which cools the compressor compartment. If there is a small space between the refrigerator and the wall, the air circulation sounds may be noticeable. ■ **Noise of Compressor.** • This operating sound happens when the compressor compresses the refrigerant. The compressor rotates at 3600RPM. The sound of compressor operation becomes louder as the refrigerator capacity increases.
"Click" sounds	■ **Explain the principles of temperature change.** • The sounds happens when pipes and internal evaporator in the refrigerator compartment expand and contract as the temperature changes during the refrigerator operation. This sound also happens during defrosting, twice a day, when the ice on the evaporator melts.
"Clunk" sound	■ **Explain that it comes from the compressor when the refrigerator starts.** • When the refrigerator operates, the piston and motor in the compressor rotate at 3600RPM. This sound is caused by the vibration of motor and piston when they start and finish their operation. This phenomena can be compared with that of cars. When the car engine ignites and starts to rotate, the loud sound becomes gradually quiet. When the engine stops, it stops with vibration.
Vibration sound	■ **Check the sound whether it comes from the pipes vibration and friction.** • Insert rubber or leave a space between pipes to avoid the noise. • Fix the fan blade if the noise is due to the collision of fan and shroud. • Fix the drip tray if it is loosened. ■ **Sound depends on the installation location.** • Sound becomes louder if the refrigerator is installed on a wooden floor or near a wooden wall. Move it to the another location. • If the refrigerator is not leveled properly, a small vibration can make a loud sound. Please adjust the level of the refrigerator.

TROUBLE DIAGNOSIS

Problems	Checks and Measures
Sounds of water flowing	■ **Explain the flow of refrigerant.** • When the refrigerator stops, the water flowing sound happens. This sound happens when the liquid or vapor refrigerant flows from the evaporator to compressor.
"Click" sounds	■ **Explain the characteriistics of moving parts.** • This noise comes from the MICOM controller's switch on the top of the refrigerator when it is turned on and off.
Noise of ice maker operation (applicable to model with ice maker). - Noise produced by ice dropping and hitting ice bank. - Noise from motor sounds “Whizz”.	■ **Explain the procedure and principles of ice maker operation.** • Automatic ice maker repeats the cycle of water supplying → icemaking → ice ejection. When water is supplied, the water supply valve in the machine room makes sounds like “Whizz” and water flowing also makes sound. When water freezes to ice, freezing sounds such as “click, click” are heard. When ice is being ejected, sounds like “Whizz” produced by a motor to rotate an ice tray and ice dropping and hitting ice bank sounds are also heard.
Noise when supplying water.	■ **Explain the principles of water supplied to dispenser.** • When the water supply button in the dispenser is pressed, the water supply valve in the compressor compartment opens and let the water flow to the water tank in the lower part of the refrigerator compartment. The water is dispensed by this pressure. When this happens, motor sound and water flowing sound are heard.
Noise when supplying ice.	■ Explain the principles of ice supply and procedure of crushed ice making in a dispenser. • When ice cube button is pressed, ice stored in the ice bank is moved by a Helix Pusher and dispensed. If crushed ice button is pressed, the cube ice is crushed. When this happens, ice crushing and hitting ice bank sounds are heard.

TROUBLE DIAGNOSIS

4-2. Measures for Symptoms on Temperature

Problems	Checks and Measures
Refrigeration is weak.	■ **Check temperature set in the temperature control knob.** • Refrigerator is generally delivered with the button set at “normal use” (MID). But customer can adjust the temperature set depending on their habit and taste. If you feel the refrigeration is weak, then set the temperature control button at “strong” position. If you adjust the button in the freezer compartment as well, the refrigeration is stronger than adjusting refrigerator only.
The food in the chilled drawer is . not frozen but defrosted	■ **The chilled drawer does not freeze food.** • Use chilled drawer for storing fresh meat or fish for short periods. For storing for a long periods or freezing food, use a freezer compartment. It is normal that frozen foods thaw above the freezing temperature (in the chilled drawer).
Refrigerator water is not cool.	■ **Check the water storage location.** • If water is kept in the door rack, please ask to keep it in the refrigerator compartment shelf. It will then become cooler.
Ice cream softens.	■ **Explain the characteristics of ice cream.** • The freezing point of ice cream is below -15°C. Therefore ice cream may melt if it is stored in the door rack. • Store ice cream in a cold place or set the temperature control button of a freezer at “strong” position.
Refrigeration is too strong.	■ **Check the position of temperature control button.** • Check if refrigeration is strong in whole area of the refrigerator or partly near the outlet of the cooling air. If it is strong in whole area, set the control button at “weak”. If it is strong only near the outlet of cool air, keep food (particularly wet and easy to frozen such as bean curd and vegetables) away from the outlet.
Vegetables are frozen.	■ **Check the vegetables storage.** • If vegetables are stored in the refrigerator shelf or chilled drawer instead of vegetable drawer, they will be frozen. Set the control button at “weak” if they are also frozen in the vegetable drawer.
The food stored at inside of the shelf freezes even the control button is set at “MID”.	■ **Check if food is stored near the outlet of the cooling air.** • The temperature at cooling air outlet is always below the freezing point. Do not store food near the outlet of the cooling air as it block the air circulation. And do not block the outlet. If the outlet of the cooling air is blocked, the refrigerator compartment will not be cooled.

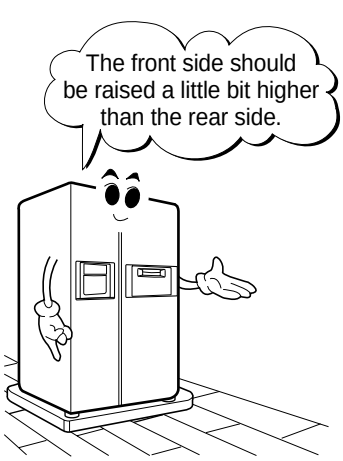
TROUBLE DIAGNOSIS

4-3. Odor and Frost

Problems	Checks and Measures
Odor in the refrigerator compartment.	■ **Explain the basic principles of food odor.** • Each food has its own peculiar odor. Therefore it is impossible to prevent or avoid food odor completely when food is stored in the completely sealed refrigerator compartment. Deodorizer can absorb some portions of the odor but not completely. The intensity of odor depends on refrigerator conditions and environments. ■ **Check the temperature control button and set at "strong".** • Clean inside of the refrigerator with detergent and remove moisture. Dry inside the refrigerator by opening the door for about 3 or 4 hours and then set the temperature control button at "strong".
Frost in the freezer compartment	■ **Explain the basic principles of frost formation.** • The main causes for frosting: - Door was left open. - Air penetration through the gasket - Too frequent door opening. (parties. etc.) - Hot foods are stored before they are cooled down. The temperature of freezer is -19°C. if temperature is set at "MID". If hot air comes into the refrigerator, fine frost forms as cold air mixes with hot air. If this happens quite often, much frost forms inside of the refrigerator. If the door is left open in Summer, ice may form inside of the refrigerator.
Frost in ice tray.	■ **Explain basic principles of frost formation.** • When ice tray with full of water is put into a freezer compartment, the water evaporates. If cool air fan operates, the moisture attached to the jaw (protruded part) of ice mold shall freeze and form frost. If warm water was put into the ice mold, the situation will become worse.

TROUBLE DIAGNOSIS

4-5. Others

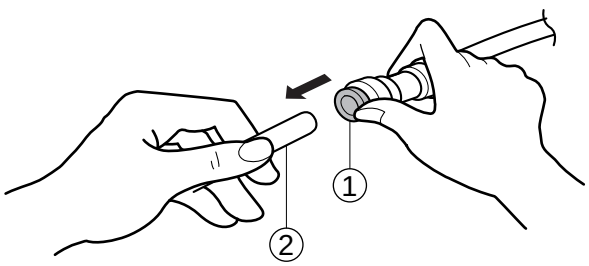
Problems	Checks and Measures
The refrigerator case is hot.	■ Explain the principles of radiator. • The radiator pipes are installed in the refrigerator case and partition plate between the refrigerator and the freezer compartment in order to prevent condensation formation. Particularly in summer or after installation of refrigerator, it may feel hot but it is normal. If there is no enough space to dissipate heat, it can be hotter due to lack of heat radiation. Please install a refrigerator in a well-ventilated place and leave a clearance between refrigerator and wall:
Small holes in a door liner	■ Explain that the hole is for releasing gas. • A small hole in the door liner is for releasing gas during insulation materials lining work. With a releasing hole, forming can be easily done .
Electric bills are too much.	■ Check the use conditions. • Too frequent door opening and hot food storing cause the compressor to operate continuously and hence increase the electric consumption and bills.
Condensation on the inside wall of the refrigerator compartment and the cover of properly vegetable drawer.	■ Explain how to store foods • Condensation forms when refrigerator is installed at damp area, door is frequently opened, and wet foods are not stored in the air tight container or wrapped. Be sure to store wet foods in the air tight container or in the wrap.
When is the power connected?	■ When should the power be connected ? • You can connect the power right after the installation. But if the refrigerator was laid flat during transportation for a long period of time and the refrigerant and compressor oils are mixed up, then this will affect badly the performance of a refrigerator. Be sure to connect the power 2~3 hours after refrigerator is installed.
Door does not open properly.  	■ Refrigerator compartment door does not open properly. • When the door is open, warm open air comes into the compartment and is mixed up with cool air. This mixed air shall be compressed and increase the internal pressure when door is closed. This causes the door sticked closely to the refrigerator in a moment. (If the refrigerator is used for a long time, it will then open smoothly.) ■ When the refrigerator compartment door is open and close, the freezer compartment door moves up and down. • When the refrigerator compartment door is open and close, fresh air comes into the freezer compartment and moves up and down the freezer compartment door. ■ Door opens too easily. • There is a magnet in the gasket rubber so that it is ok. if door is securely closed without a gap. It can be open easily if the foods in the refrigerator or freezer compartments hold the door open. ■ A door does not close properly. • If the rear side of the refrigerator is raised higher than front side, door shall not be easily closed. Adjust the level of refrigerator with levelling screws.

HOW TO DISASSEMBLE AND ASSEMBLE

1. DOOR

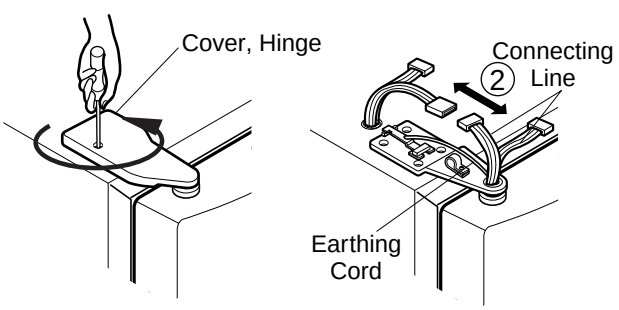
1) Remove lower cover and then disconnect water supply tube in the lower part of freezer door.

• Pull a water supply tube ② forward while pressing ① part to disconnect water supply tube as shown below.

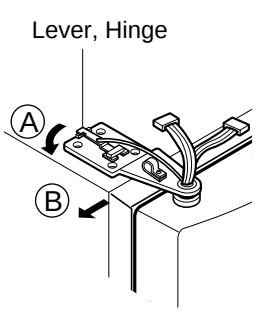


2) Remove a freezer door.

(1) Loosen hinge cover screw of freezer door and remove cover.
Disconnect all connecting lines except earthing cord.

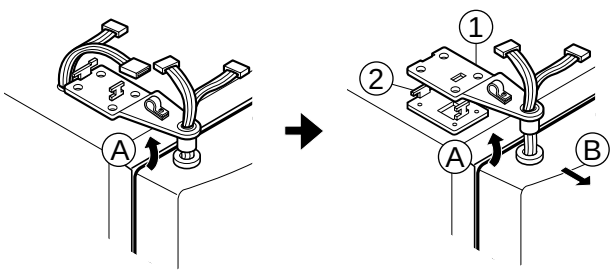


(2) Turn hinge lever in arrow Ⓐ direction until it is loosened and take it out in arrow Ⓑ direction.

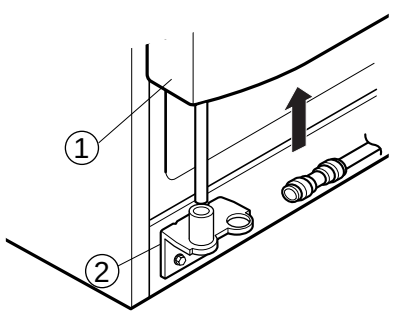


Note : • *When disconnecting refrigerator door, turn hinge lever counterclockwise.*
• *If hinge lever or bracket hinge pin is deformed during assembling freezer and refrigerator doors, fix two screws (Tap Tite Screw, M6: Hinge, L fixing screw) in the hole of upper hinge.*

(3) Disconnect upper hinge ① from a hinge supporter ② by grasping the front part of upper hinge and lifting up (Hinge Assy, U) in arrow direction Ⓐ and pull forward in arrow Ⓑ direction. Be careful as the door may be fallen down.



(4) Lift up the freezer door ① in arrow direction and disconnect the door from the lower hinge ②. Don't pull a door forward.



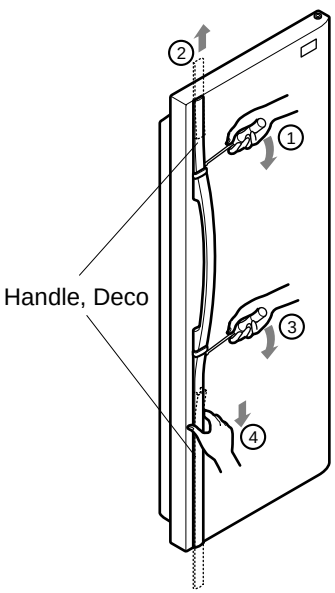
Note : • *Lift up a freezer door until a water supply tube is fully taken out.*

(5) Assembly is the reverse order of disassembly

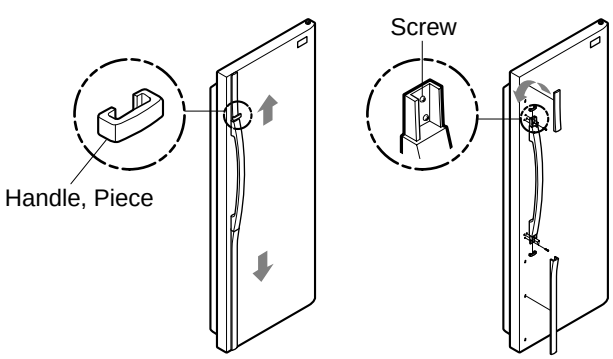
HOW TO DISASSEMBLE AND ASSEMBLE

2. HANDLE

1) Put blade screwdriver into a groove on the side of a Deco handle and lift up a little bit in arrow ① direction and push up with hand in arrow ② direction and disconnect.



2) Put blade screwdriver into a groove on the side of a DECO handle and lift up in arrow direction ③ and push down with hand in arrow direction ④ and disconnect.
3) Push up a piece handle ③ in arrow direction with hand and disconnect.
4) Turn screw in arrow direction with a cross driver and disconnect.



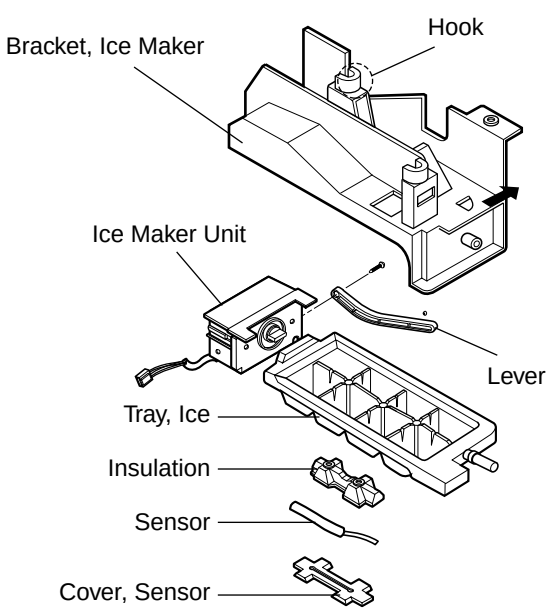
3. SHROUD, GRILLE FAN

1) Loosen two screws after disconnecting a cap screw of a grille fan(U) with a balde screwdriver.
2) Disassembly of a grille fan(U) : Pull forward after opening hook at → part with a blade screwdriver.
3) Disconnect housing A of a grille fan (L) from the main body.
4) Disassembly of a grille fan (L) : Hold upper part of a grille fan(L) and pull forward carefully.
5) Loosen two screws.
6) Disassembly of shroud. F(U) : Disconnect housing of B after removing two rail guides with a blade screwdriver.
7) Disassembly of shroud. F(U) : Hold upper part and pull forward.
8) Check foam PU sticking conditions around a shroud, F(U) and F(L) during assembling. If damaged, torn or badly sticked, assemble with a new one after sealing well.

4. ICEMAKER ASSY

1. Dispenser Model

1) How to disassemble:
   (1) Remove ice bank from the freezer compartment.
   (2) Loosen two screws on the upper part of icemaker bracket.
   (3) Disconnect icemaker bracket so that it can slide forward.
   (4) Disconnect icemaker housing and sensor housing.
   (5) Disconnect icemaker horizontally by pressing bracket hook part. (Don't disassemble further. The set value may be changed.)
2) How to assemble : The assembly is the reverse order of the above disassembly.

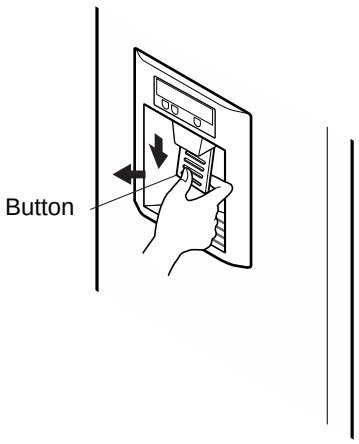


Note : *When the ice tray is not horizontal after assembly, assembly must be wrong. Check and assemble again.*

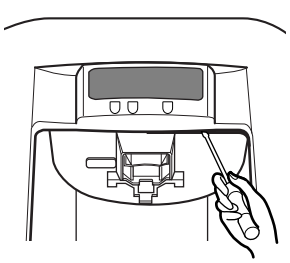
HOW TO DISASSEMBLE AND ASSEMBLE

5. DISPENSER

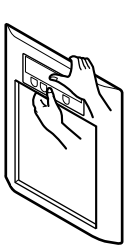
1) Disconnect button assembly by pulling down until it stops and then pulling forward.



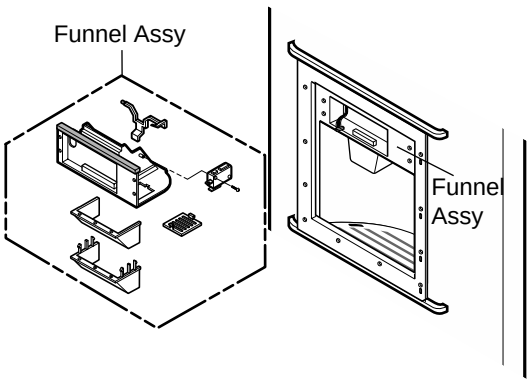
2) Remove display frame Assy by making a gap between a display frame Assy. and funnel Assy. with a balde screwdriver and pulling it forward. The cover dispenser is fixed with a hook.



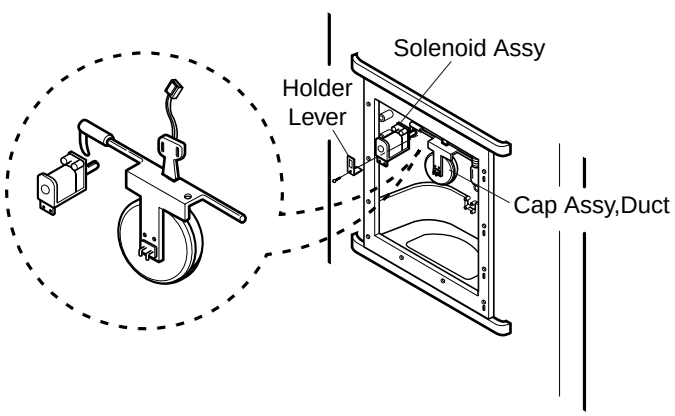
3) Display Assy can be disconnected by pressing the upper part of a cover dispenser and pushing a display Assy. after disconnecting display frame Assy. housing.



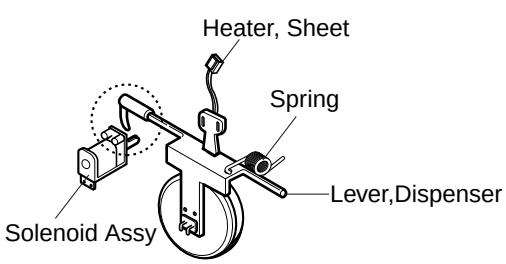
4) Loosen four screws with a phillips screwdriver and pull a funnel Assy to disconnect.



5) Duct cap Assy is disconnected if hold lever connecting screw is loosened with a phillips screwdriver.

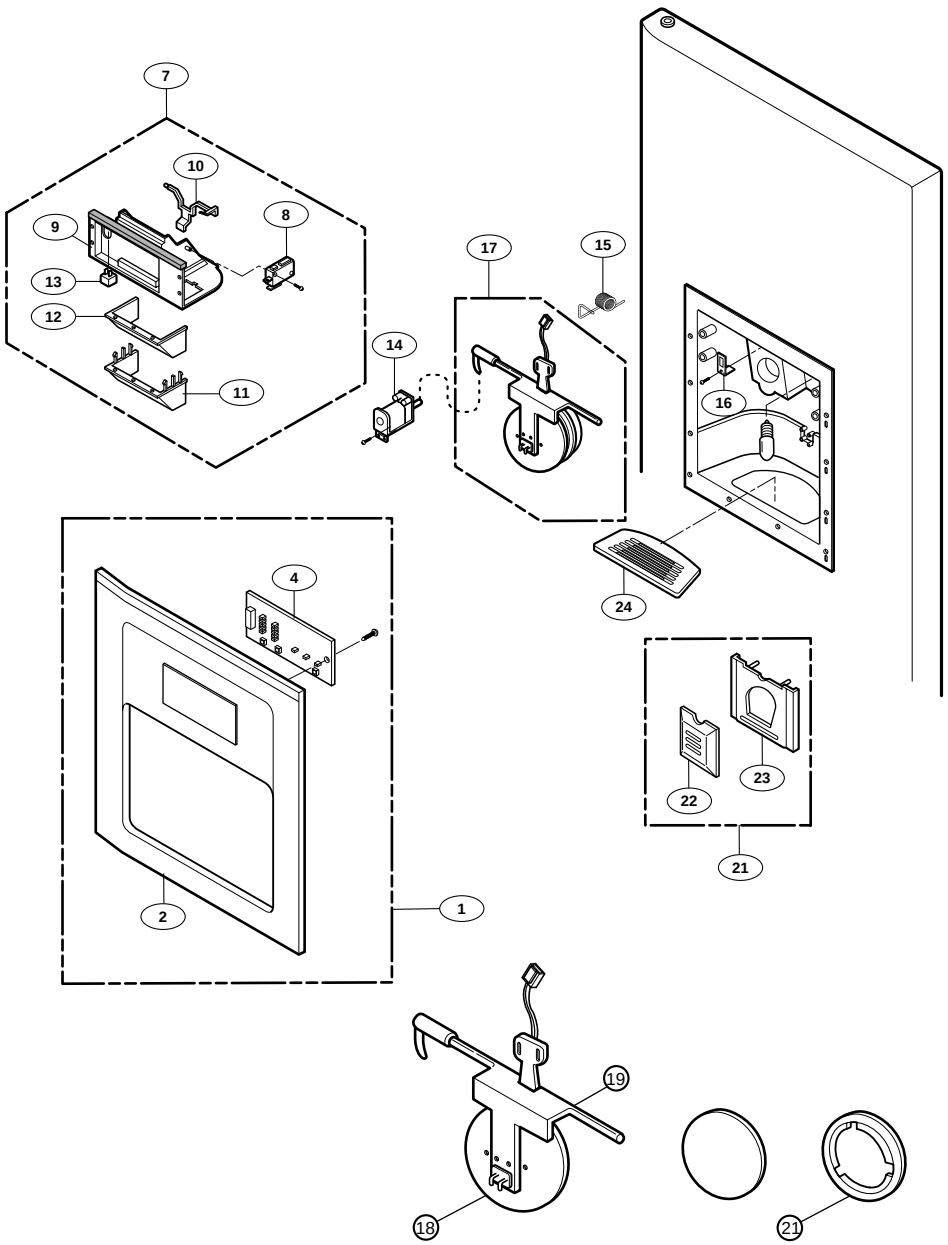


6) For assembling a duct cap Assy., insert one end of a spring into the right hole of dispenser lever, and insert the other end into the right hole in upper part of dispenser. And then assemble a holder lever after fixing a holder at a solenoid Assy working part.



HOW TO DISASSEMBLE AND ASSEMBLE

7) Dispenser Related Parts



1	FRAME ASSY, DISPLAY
2	COVER, DISPENSER
4	PWB(PCB) ASSY, DISPLAY
7	FUNNEL ASSY
8	SWITCH, MICRO
9	FRAME, FUNNEL
10	LEVER(SWITCH)
11	FUNNEL
12	RUBBER, FUNNEL
13	SWITCH, ROCKER
14	SOLENOID ASSY
15	SPRING
16	HOLDER, LEVER
17	CAP, DUCT
19	LEVER, DISPENSER
20	RUBBER, CAP
21	BUTTON ASSY
22	BUTTON
23	HOLDER, BUTTON
24	DECO, DRAIN

< (17) Cap Assy, Duct Detailed Drawings>

HOW TO DISASSEMBLE AND ASSEMBLE

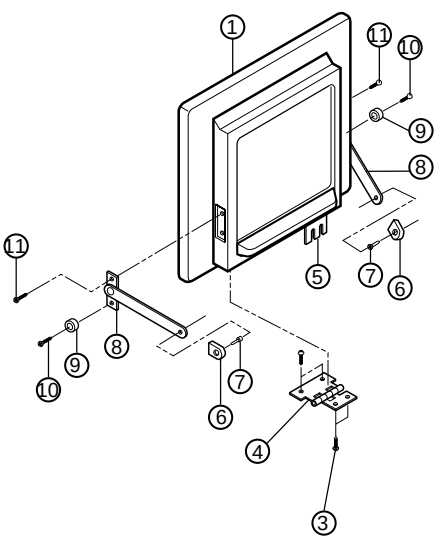
6. WATER TANK AND WATER LINE

▶ The water tank at back and lower part of a refrigerator is fixed by one screw and has a capacity containing 7 glasses (180cc per glass) of cold water. It will take time to make more cold water in the tank.

* The first portion of dispensed water is not cold even though the refrigerator is working. In this case, dispense ice first in the cup and then water to make a cold water.

7. HOME BAR

7-1. Home Bar related parts

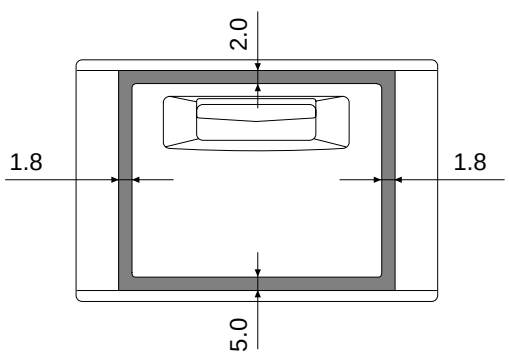


1	DOOR ASSY, H/BAR	7	SCREW TAP TITE(ARM)
2	SEREW, TAP TITE(HINGE-H/B)	8	ARM ASSY
3	SCREW MACHINE(HINGE-H/B)	9	STOPPER
4	HINGE ASSY H/BAR	10	SCREW, MACHINE(STOP ARM-H/B)
5	HINGE ASSY H/BAR	11	SCREW MACHINE(HINGE-H/B)
6	CAP, ARM		

7-2. Home Bar parts disassembly and assembly

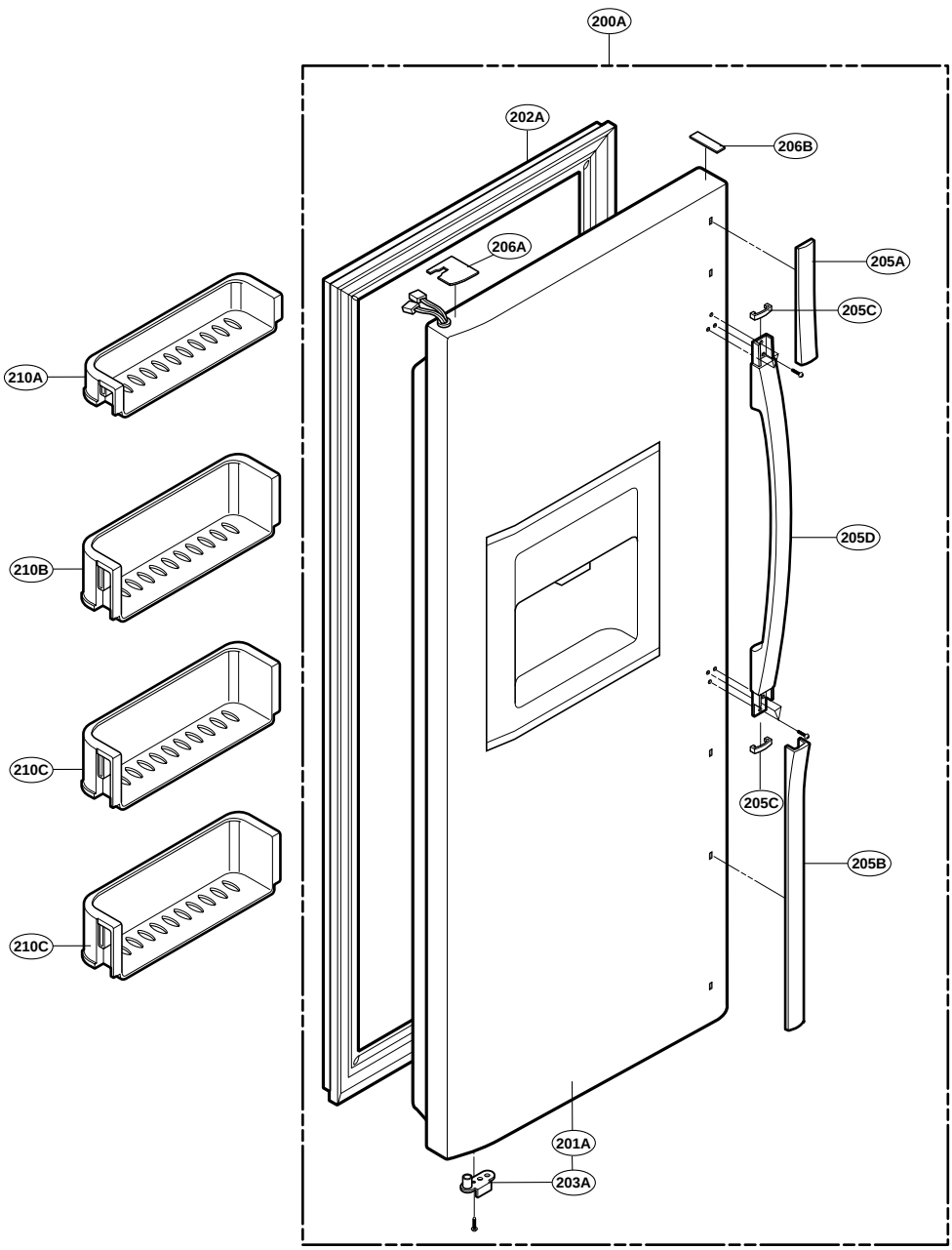
1) Disconnect H/Bar Door Assy ①.
2) Loosen two screws ⑦ attached on the refrigerator compartment door with a phillips screwdriver. And loosen 4 screws ② and two screws ③. Pull H/Bar door Assy ①. forward to disassemble.
3) Loosen two screws ⑩, ⑨ fixed on H/Bar door Assy. and two screws ⑪ with a cross driver to disassemble arm Assy.
4) Assemble parts by performing the disassembly in reverse order.

Note : • *Assemble carefully parts ⑦, ⑩, ⑪ until they are fixed firmly when assembling them.*
• *Adjust exterior gap by adjusting parts ②, ⑦ and when assembling.*



EXPLODED VIEW

FREEZER DOOR PART: GR-P247, GR-P207, GR-L247, GR-L207

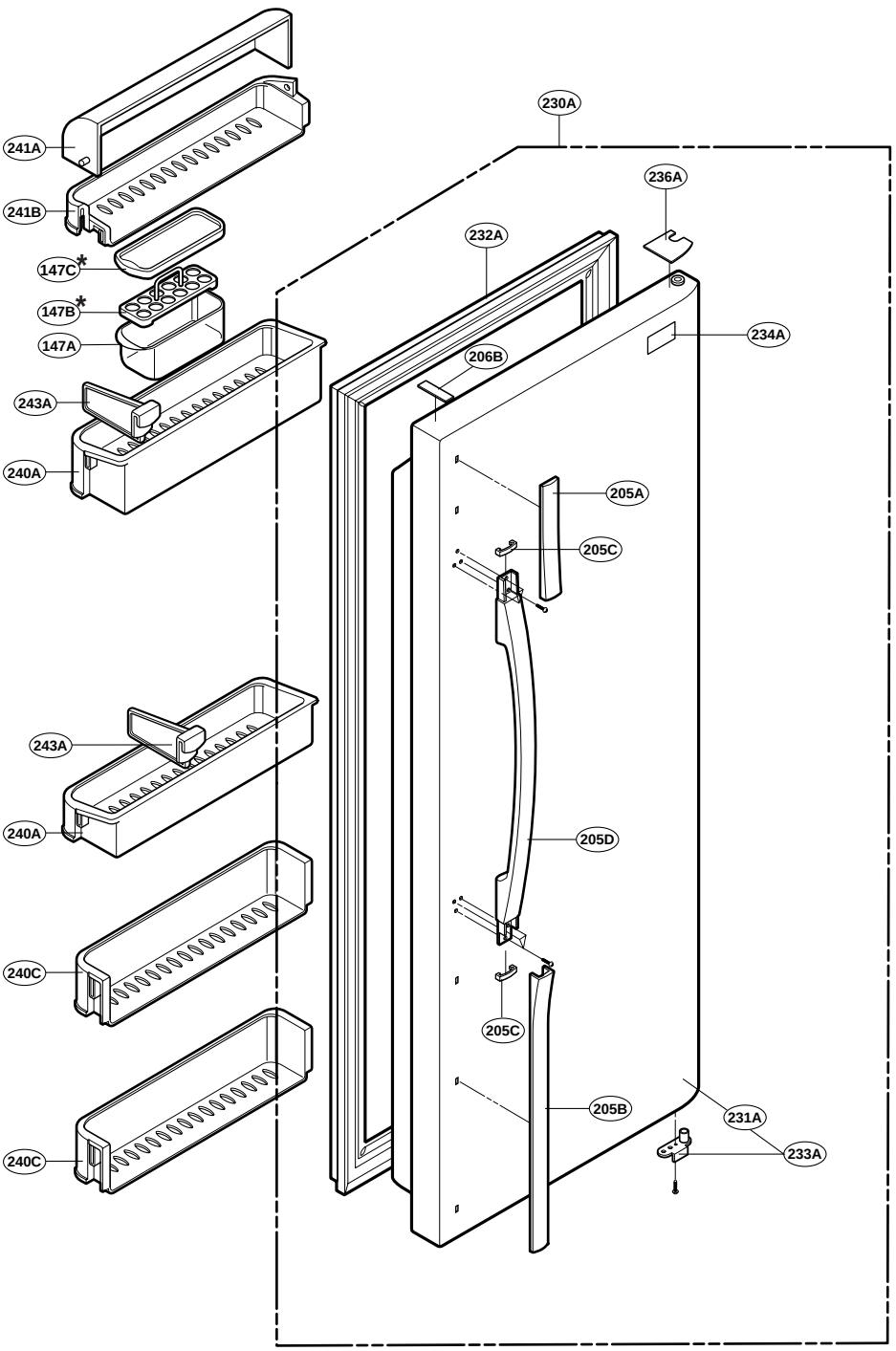


EXPLODED VIEW

Ref No. : GR-L247, GR-L207, GR-B247, GR-B207

REFRIGERATOR DOOR PART

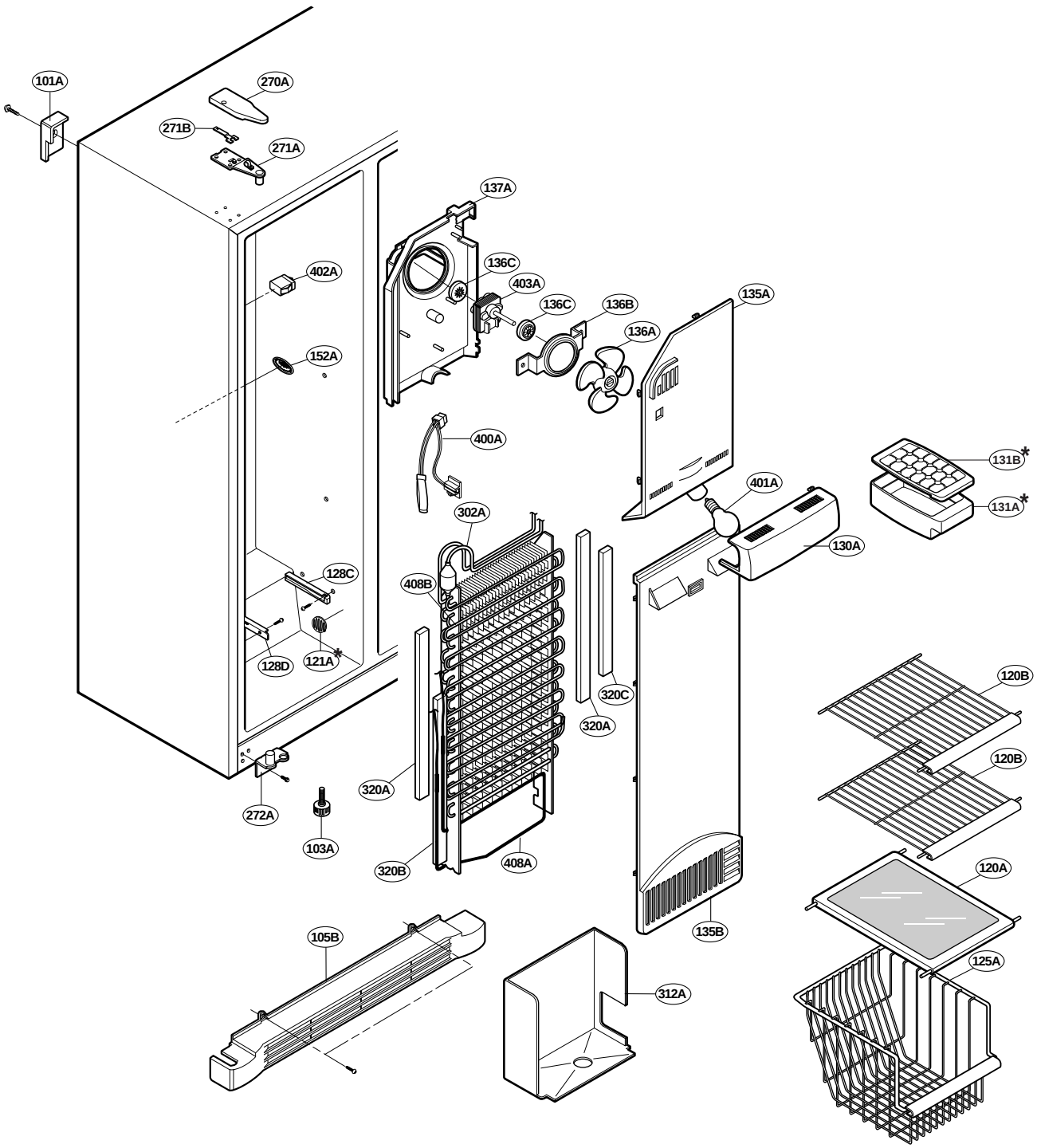
*** : Optional part**



EXPLODED VIEW

FREEZER COMPARTMENT

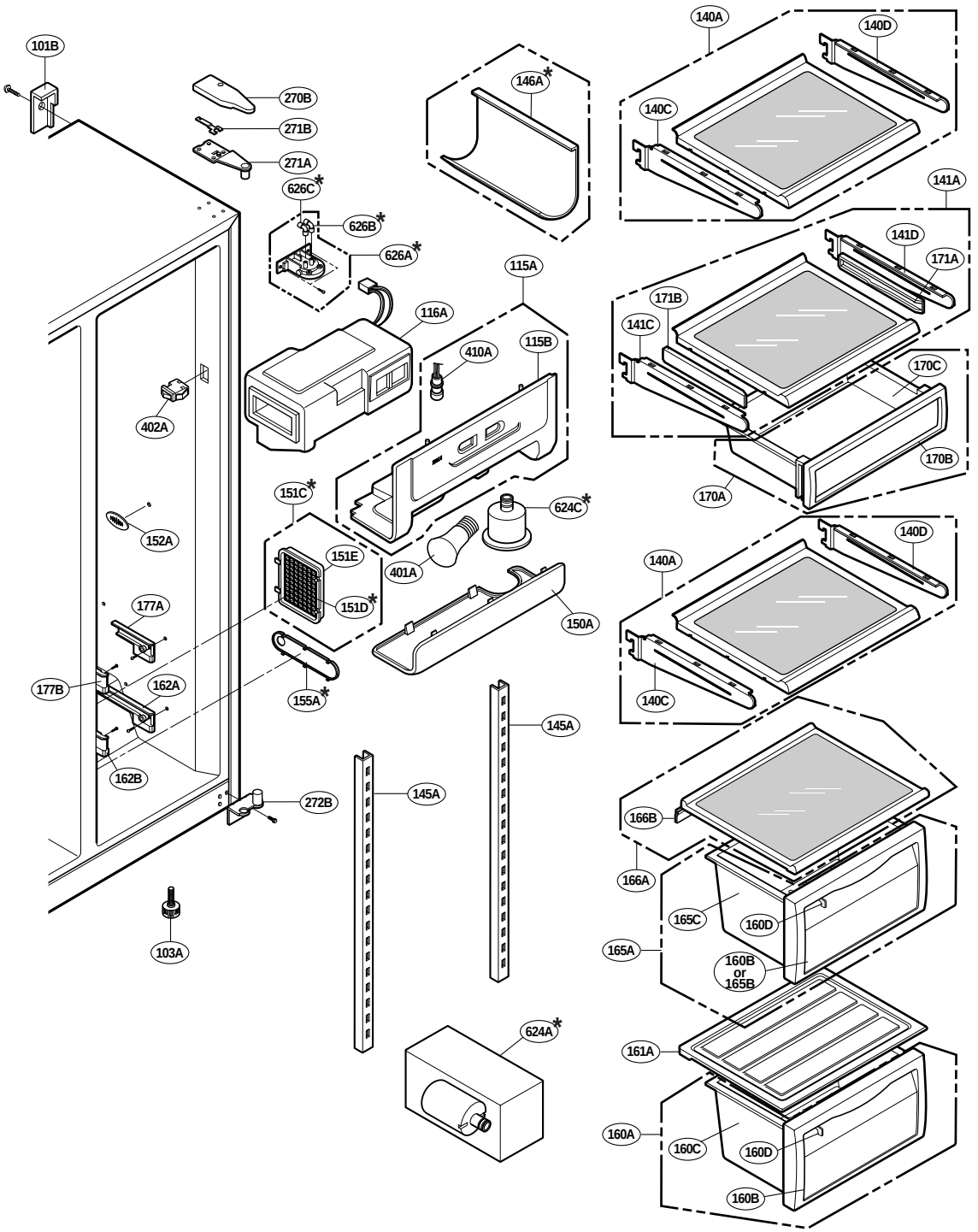
*** : Optional part**



EXPLODED VIEW

REFRIGERATOR COMPARTMENT

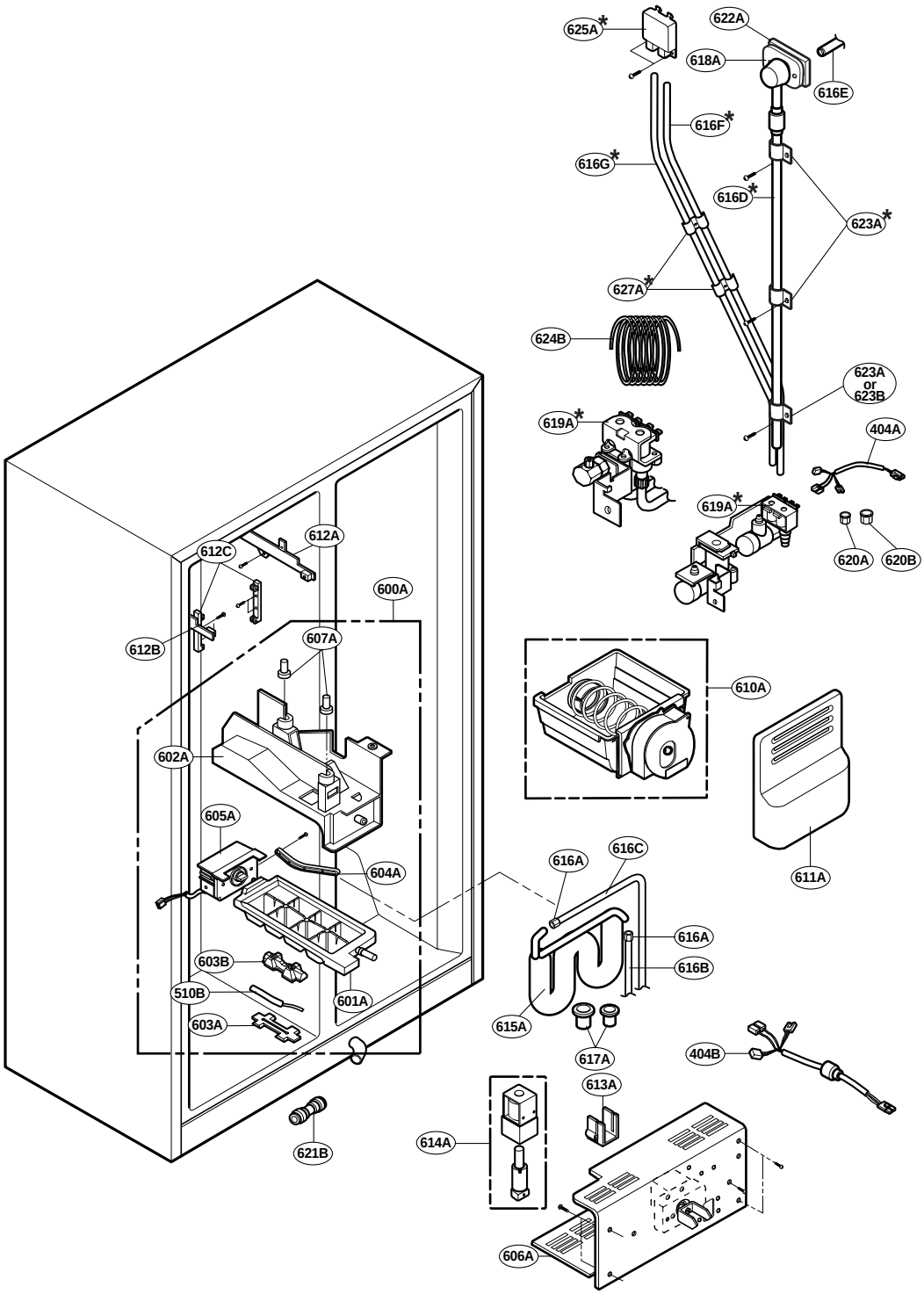
*** : Optional part**



EXPLODED VIEW

ICE & WATER PART

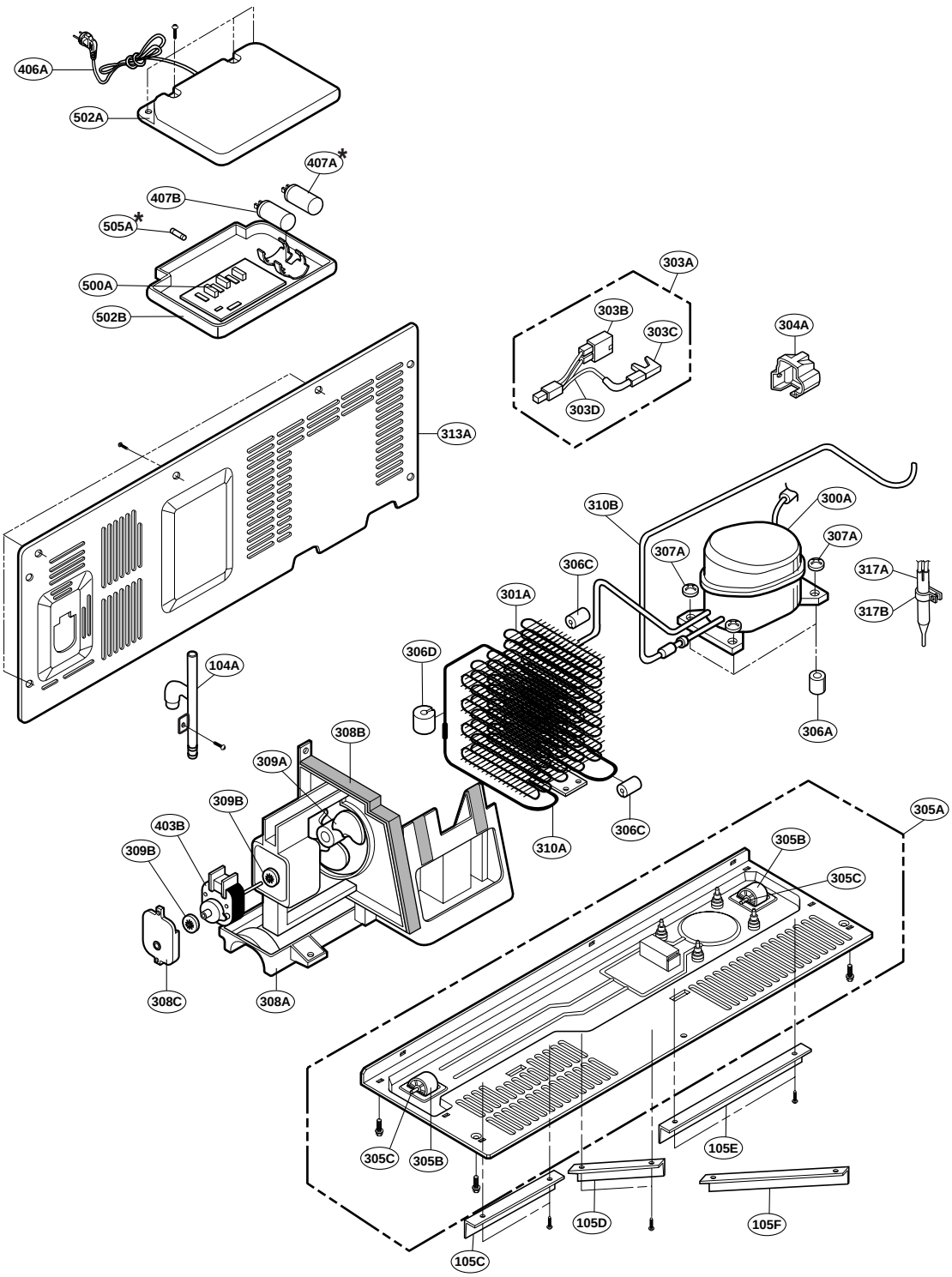
*** : Optional part**



EXPLODED VIEW

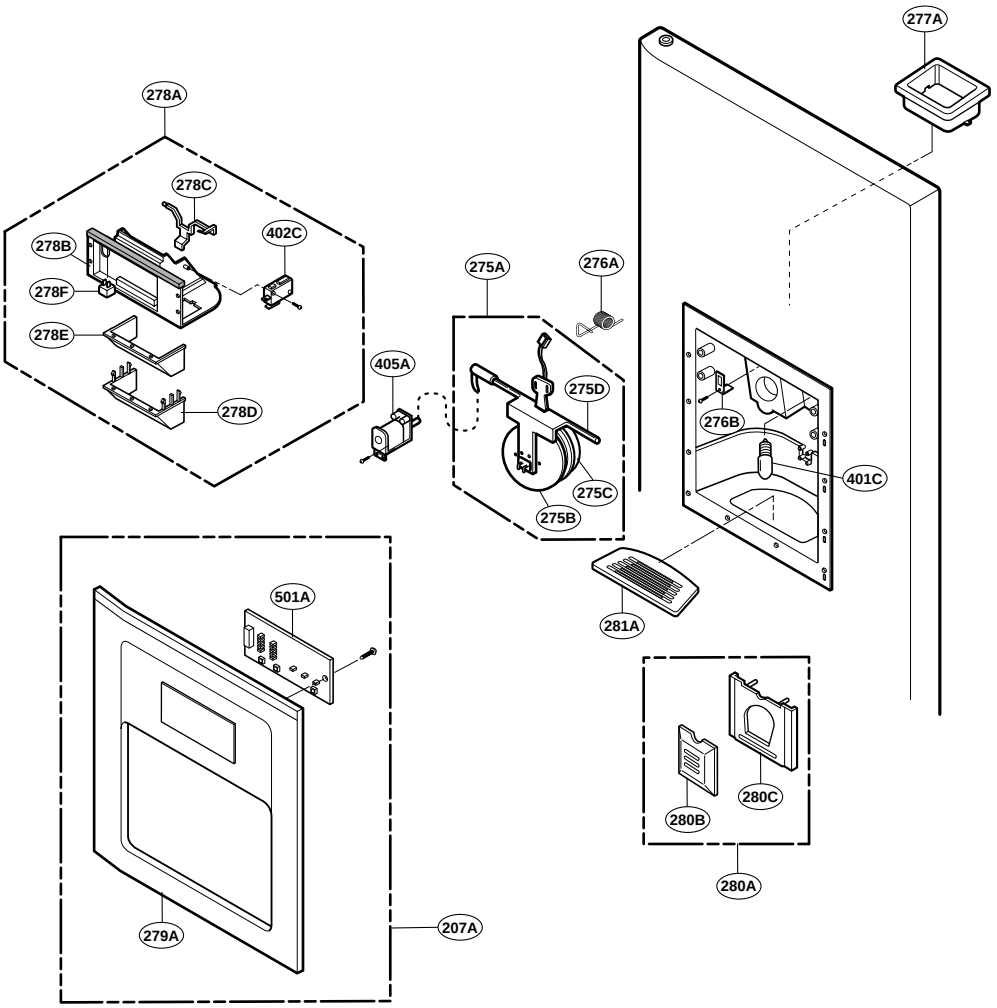
MACHINE COMPARTMENT

*** : Optional part**



EXPLODED VIEW

DISPENSER PART

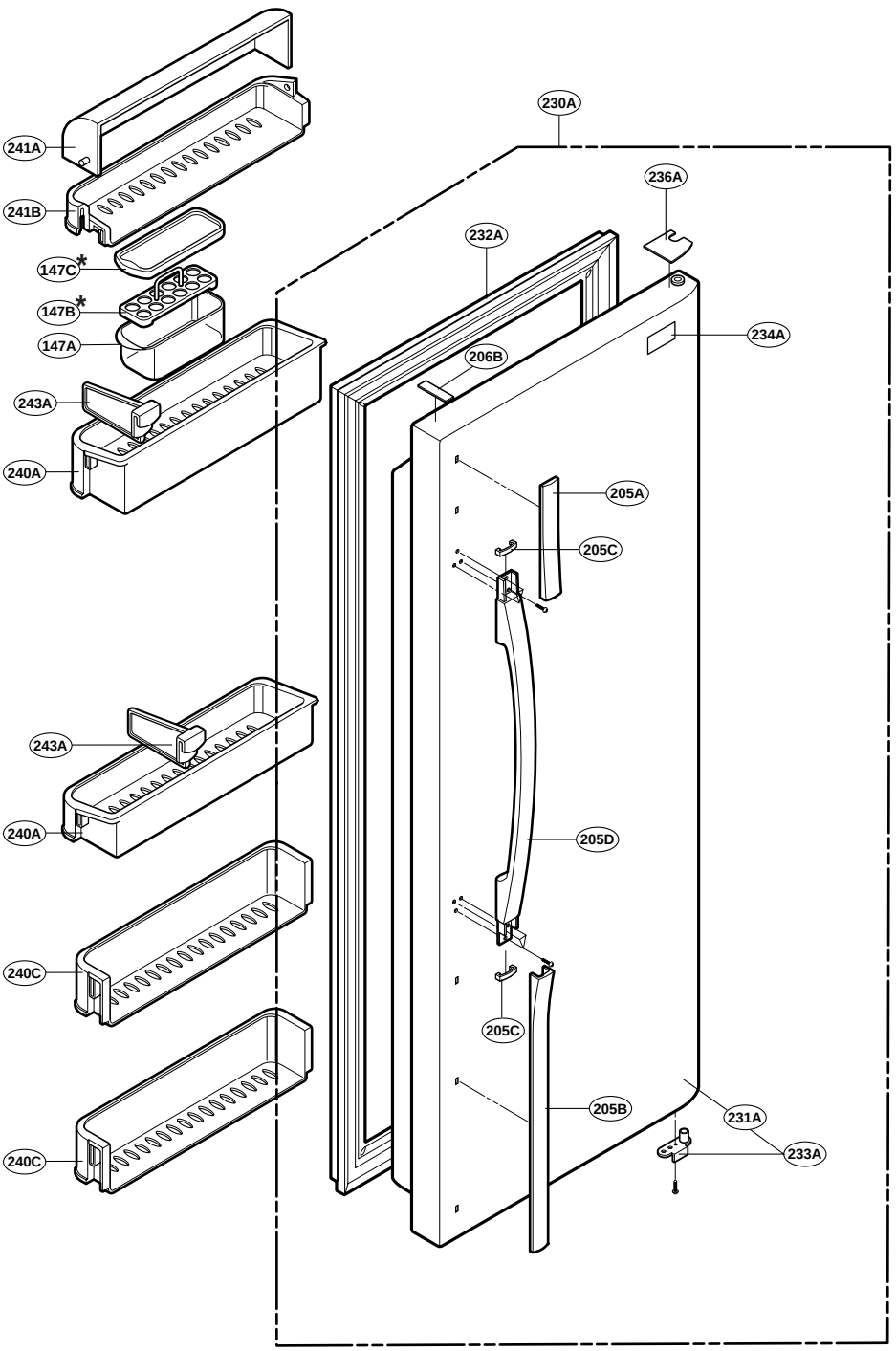


EXPLODED VIEW

Ref No. : GR-L247, GR-L207, GR-B247, GR-B207

REFRIGERATOR DOOR PART

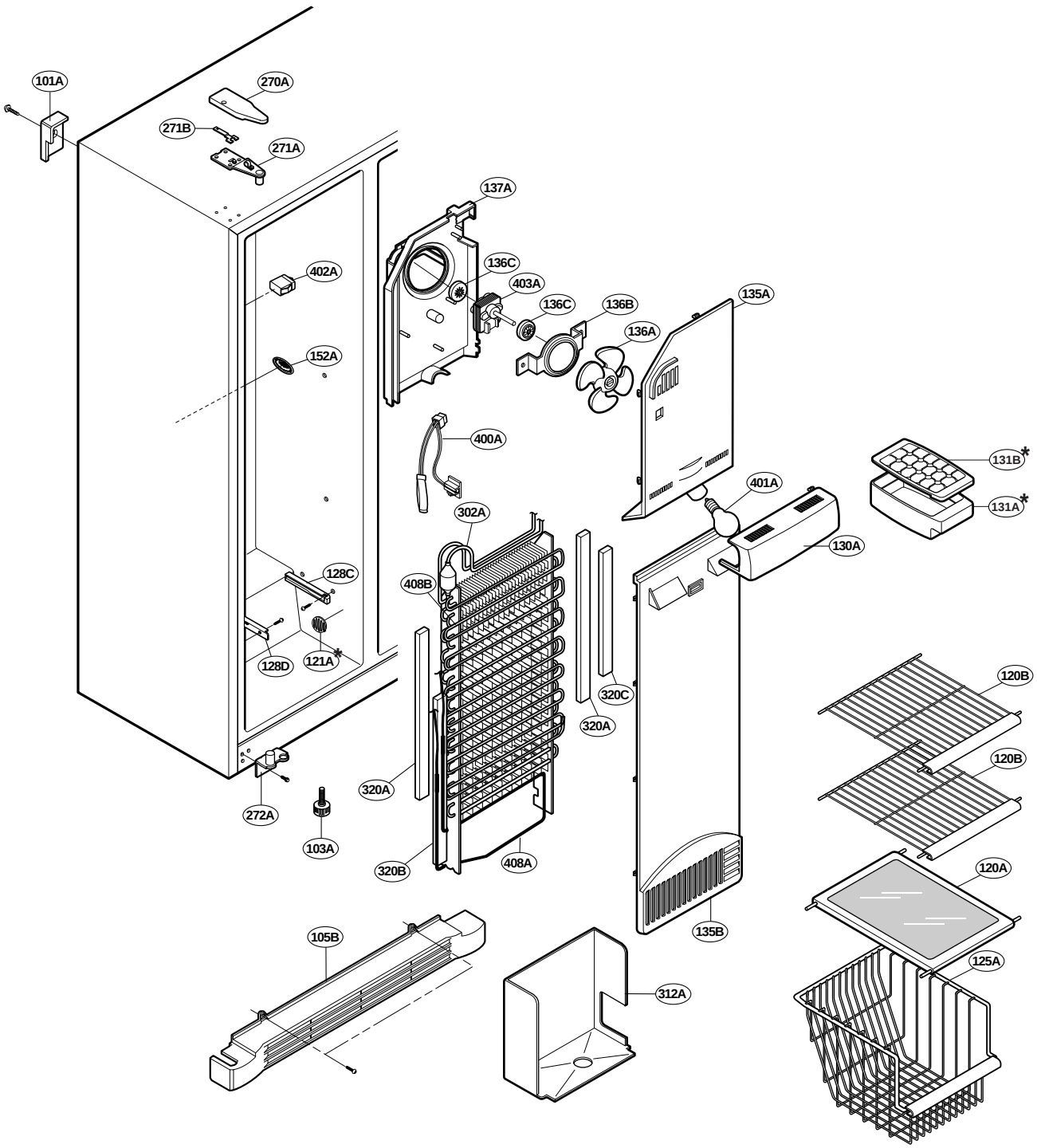
*** : Optional part**



EXPLODED VIEW

FREEZER COMPARTMENT

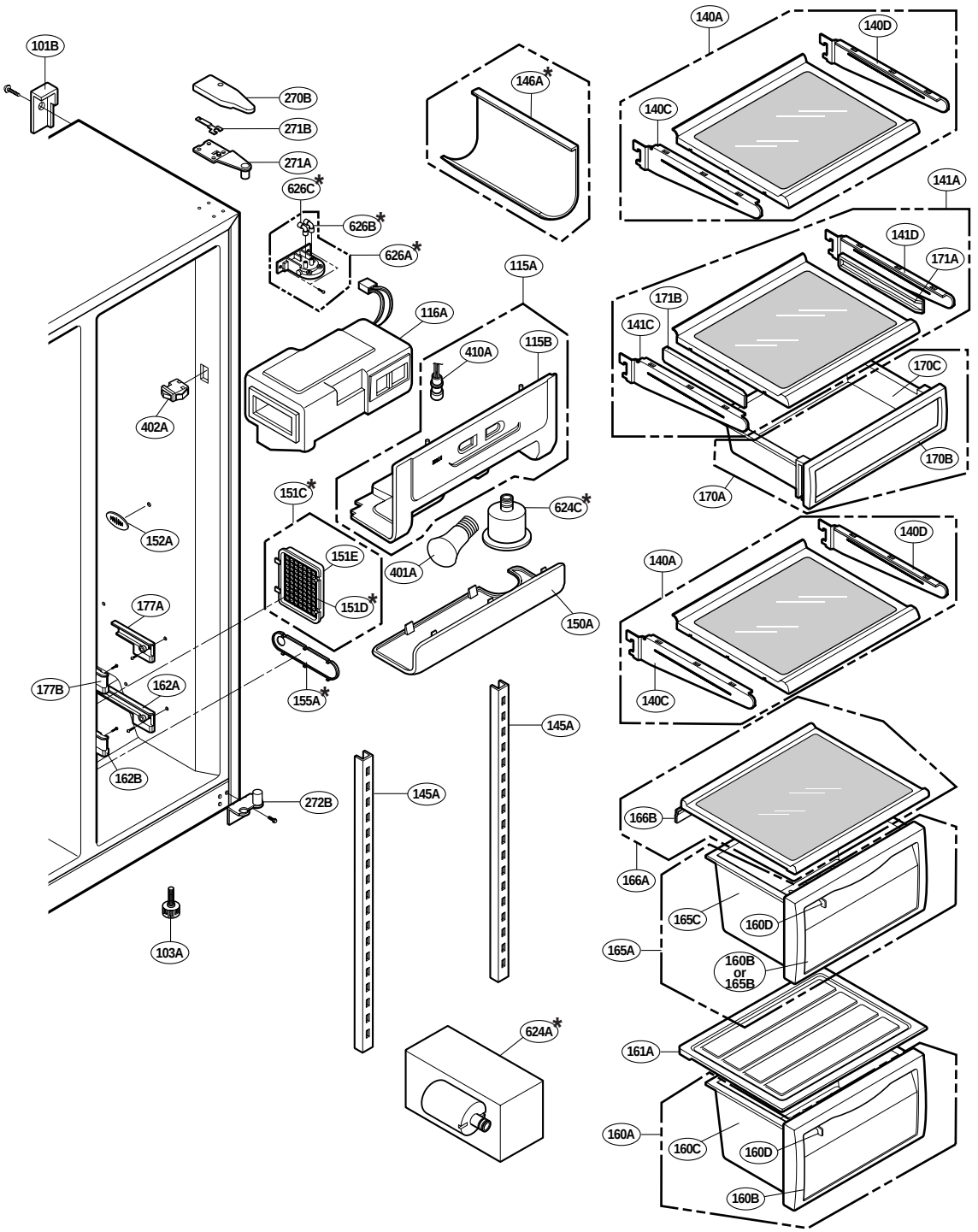
*** : Optional part**



EXPLODED VIEW

REFRIGERATOR COMPARTMENT

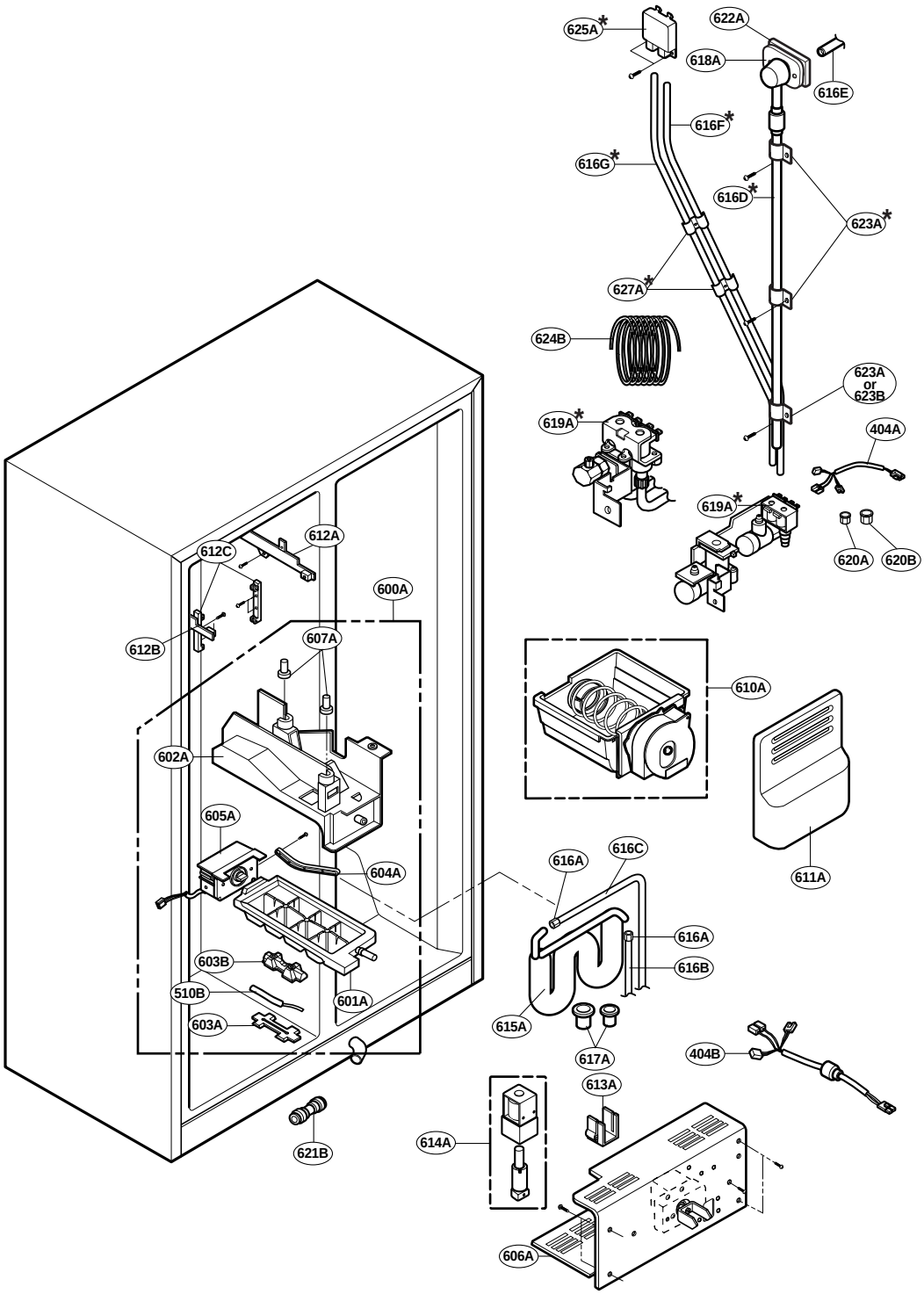
*** : Optional part**



EXPLODED VIEW

ICE & WATER PART

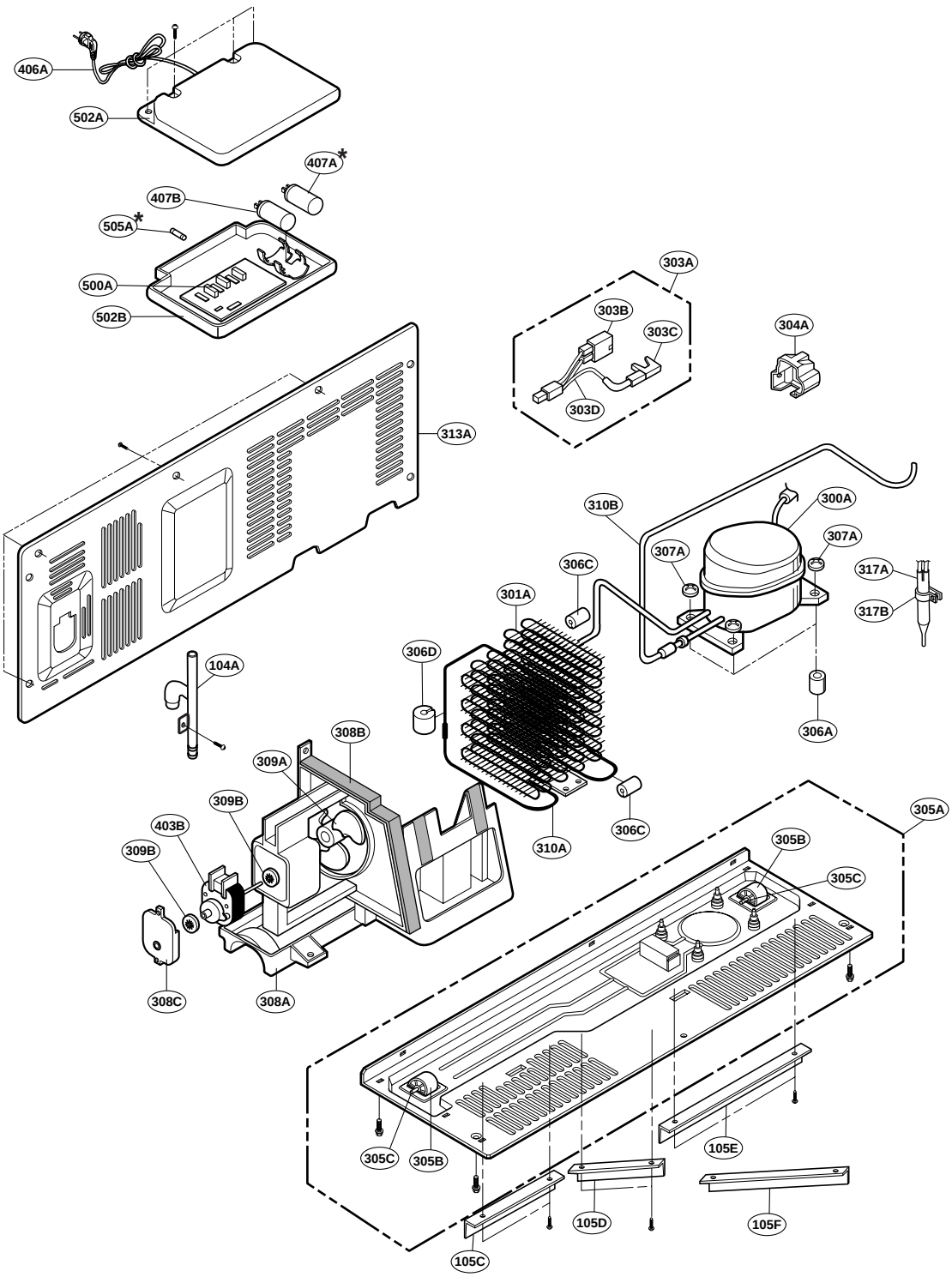
*** : Optional part**



EXPLODED VIEW

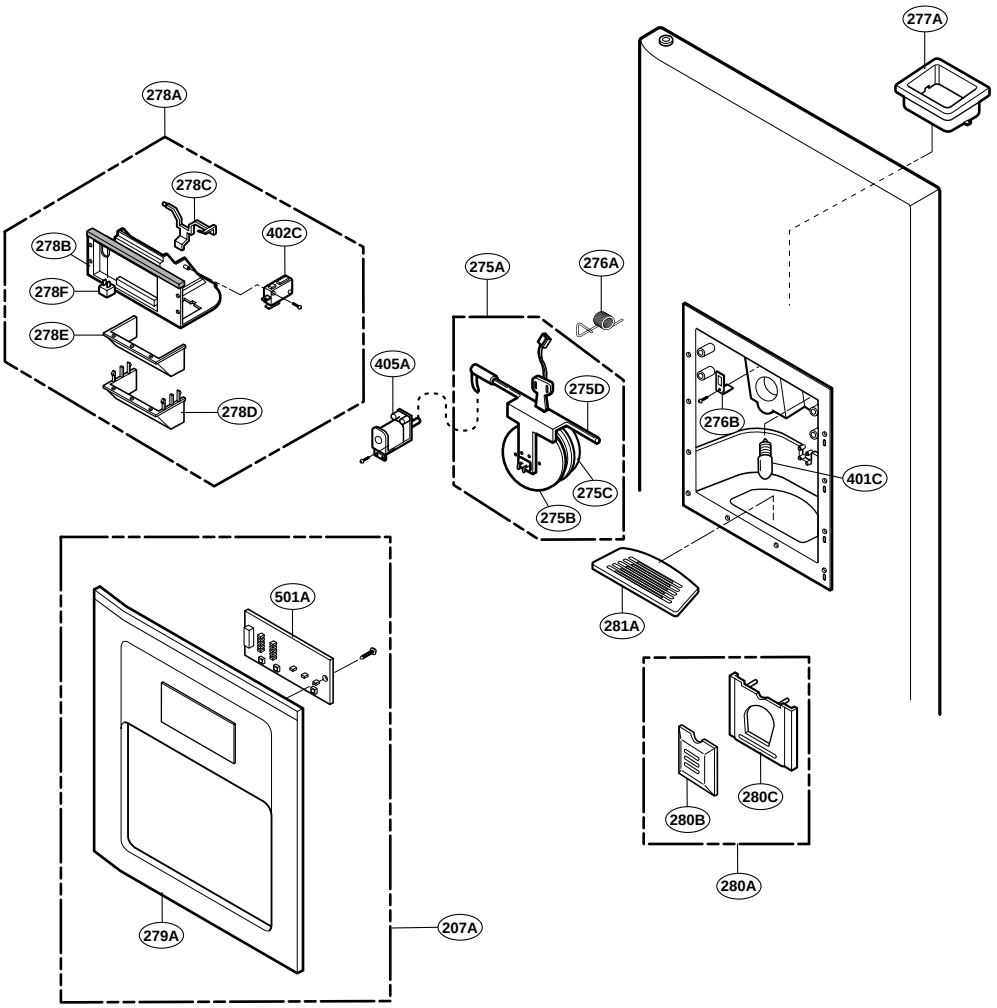
MACHINE COMPARTMENT

*** : Optional part**



EXPLODED VIEW

DISPENSER PART



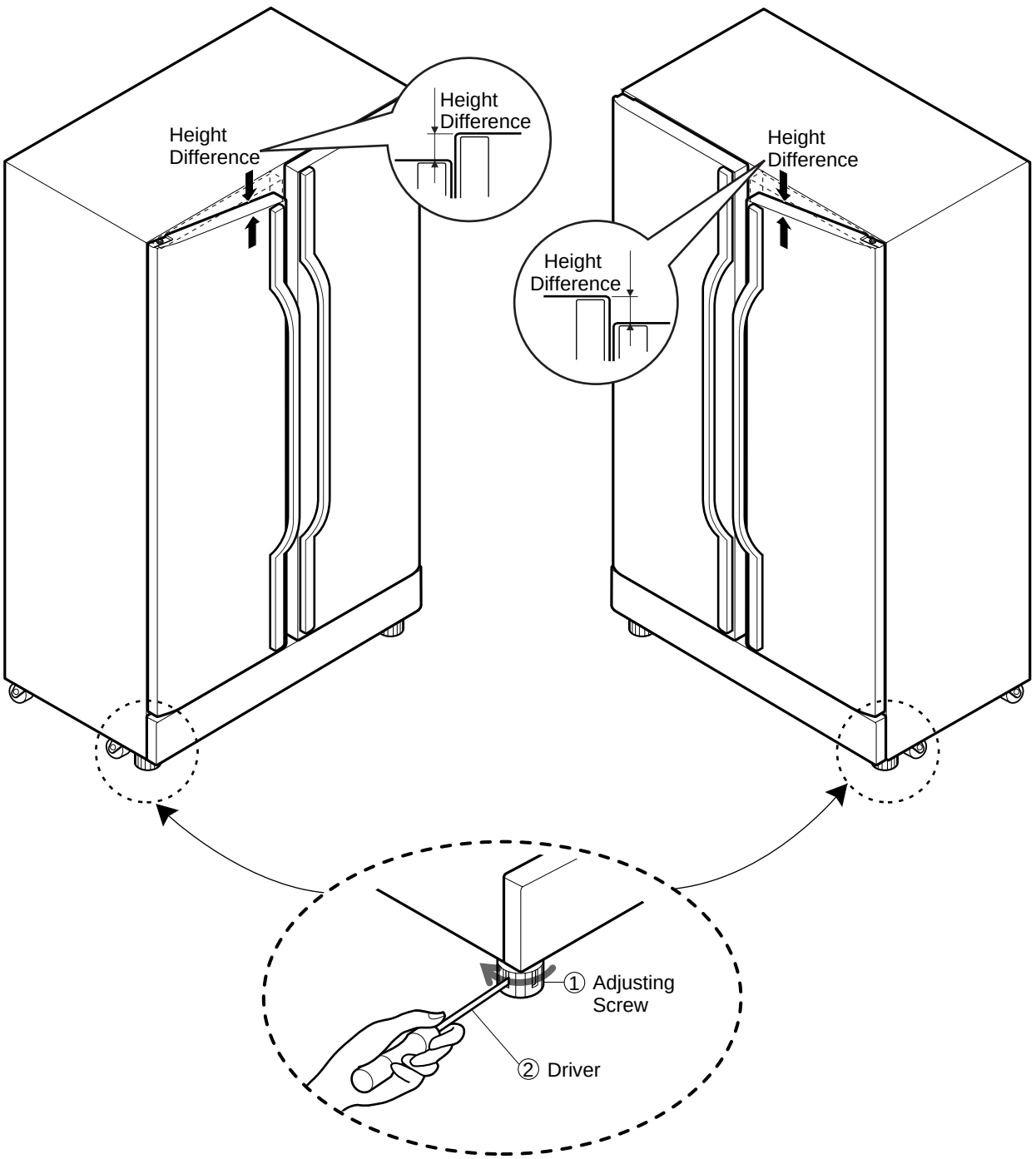
HOW TO INSTALL REFRIGERATOR

1. How to Adjust Door Height of Refrigerator

■ Make the refrigerator level first. (If the refrigerator is not installed on the flat floor, the height of freezer and refrigerator door may not be the same.)

1. If the height of freezer door is lower than that of refrigerator compartment :

2. If the height of freezer door is higher than that of refrigerator compartment :



Insert a driver ❷ into the groove ❶ of adjusting screw and rotate driver in arrow direction (clockwise) until the refrigerator becomes horizontal.

Insert a driver ❷ into the groove ❶ of adjusting screw and rotate driver in arrow direction (clockwise) until the refrigerator becomes horizontal.

HOW TO INSTALL REFRIGERATOR

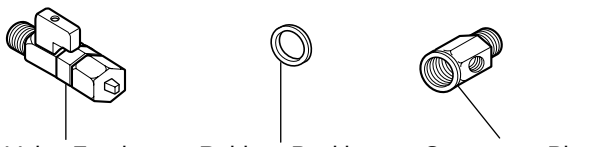
2. How to Install Water Pipe

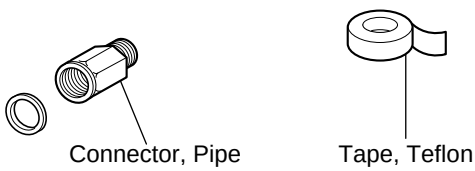
■ Before Installation

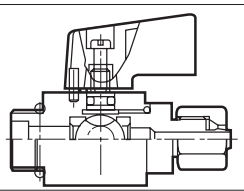
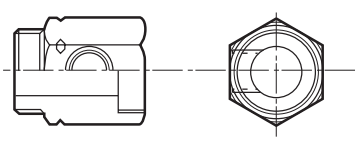
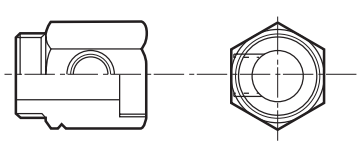
1. The icemaker requires the water pressure of 1.5 - 8.5kgf/cm^2. (It is acceptable if city water fills a cup of 180cc with water for 3 seconds)
2. Install booster pump where the city water pressure is below 1.5kgf/cm^2 for normal operation of water and ice dispenser.
3. The total length of water pipe shall be less than 12m. Do not bend the pipe at right angle. If the length is more than 12m, there will be troubles on water supply due to water pressure drop.
4. Please install water pipe where there is no heat around.

2-1. When connecting directly to the water tap.

■ Please confirm the following installation parts.





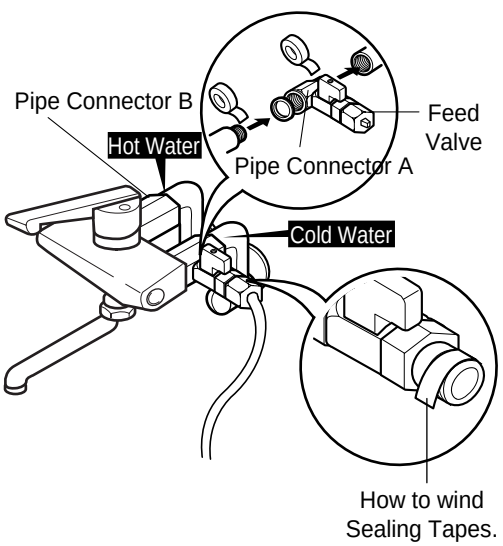
Class.	Shape and Spec.	Nomenclature	P/No	Remarks
Conve-rtible Water Valve		Valve Feed	5221JA3001A	Common Use
Water Conn-ector		Connector, (MECH) Pipe Conversion Connector(3/4") Balance Conector(3/4") Packing(ø24x3t)	4932JA3003A 6631JA3004A 6631JA3004B 3920JA3001B	No Holes
	Connector, (MECH) Pipe 	4932JA3003B Conversion Connector(W25) Balance Conectoor(W25) Packing(ø23x3t)	6631JA3004C 6631JA3004D 3920JA3001A	No Holes
		Connector, (MECH) Pipe Conversion Connector(W28) Balance Conector(W28) Packing(ø26x3t)	4932JA3003C 6631JA3004E 6631JA3004F 3920JA3001C	No Holes
		Connector, (MECH) Pipe Conversion Connector(1/2") Balance Conector(1/2") Packing(ø19x3t)	4932JA3003D 6631JA3004G 6631JA3004H 3920JA3001D	No Holes

HOW TO INSTALL REFRIGERATOR

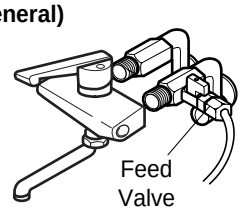
1. Connection of Pipe Connector A and B.

1) Turn off main valve of water pipe.
2) Disconnect water tap from piping by loosening nuts.
3) Connect pipe connector A and B to piping after sealing the pipe connector with sealing tapes.
4) Connect feed valve to pipe connector A.
5) If there is only one tap water pipe, connect pipe connector A only and install feed pipe.

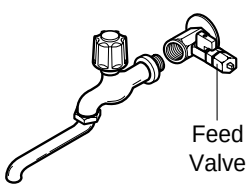
Caution : • Feed pipe should be connected to cold water line. If it is connected to hot water line, trouble may occur.
• Please check rubber packing when connecting feed pipe.



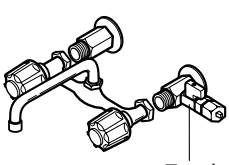
Single Lever Type Faucet (general)



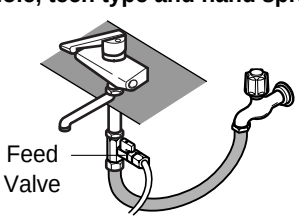
General Type



Two Hands Type Faucet



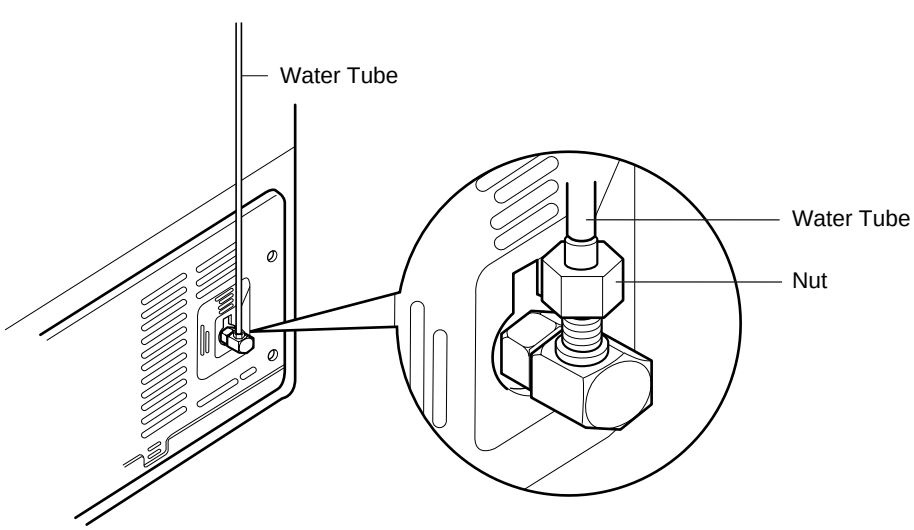
Single Lever Type Faucet (one hole, tech type and hand spray)



2. Water Supply

1) After the installation of feed water, plug the refrigerator to the earthered wall outlet, press the water dispenser button for 2 - 3 minutes, and confirm that the water comes out.

2) Check leakage at connecting part, then arrange water tube and locate the refrigerator at its regular place if there is no leaking.



HOW TO INSTALL REFRIGERATOR

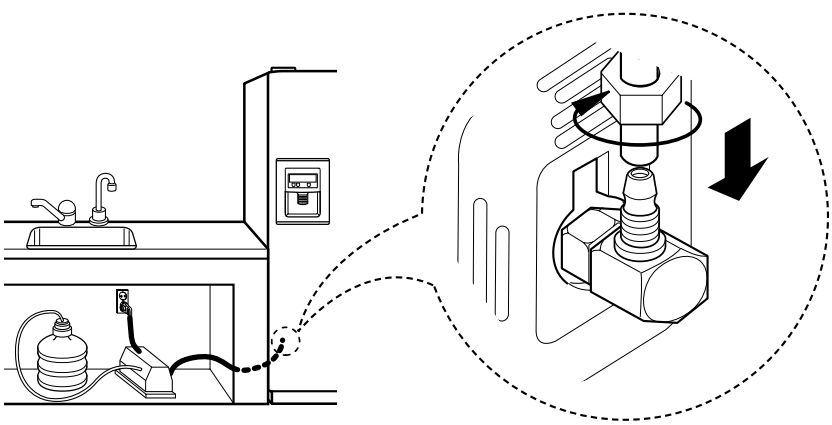
3. When customer uses bottled water.

*If customer wants to use bottled water, extra pump should be installed as shown below.

1. The pump system should not be on the floor (it may cause noise and vibration). Securely fasten the inlet and outlet nuts of pump.
2. If there is any leakage after installation, cut the water tube at right angle and reassemble.
3. When put the water tube end into the bottle, leave a clearance between bottle bottom and water tube end.

4 Check water coming out and any leakage.

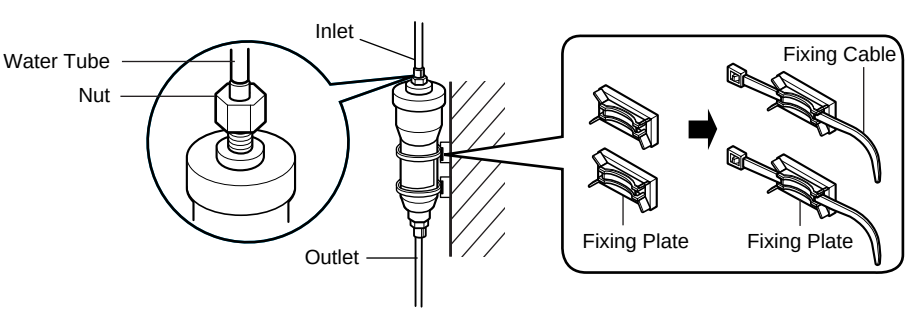
Caution : • If feed tube is more than 4m, less water will come out due to pressure drops.
• Use standard feed tube to prevent leaking.



■ Outternal Filter

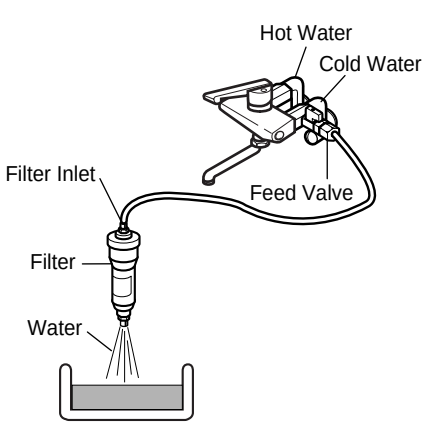
1. Filter Fixation

1) Connect feed tube to the filter outlet and water valve connecting tube.
2) Fix the filter at proper place around the sink where it is easy to replace the filter and to receive the cleaning water. Please consider the length of tube shall be less than 12m when locating filter.
3) When fixing the filter, use fixing plate and cable depending on the surrounding conditions.



2. Filter Cleaning

1) Connect feed tube to the inlet of feed valve and filter.
2) Clean the main valve and feed valve with water for at least one minute until clean water comes out.

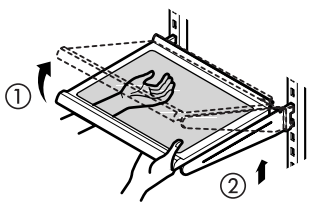


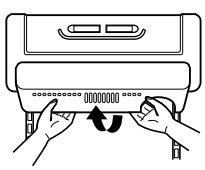
HOW TO INSTALL REFRIGERATOR

■ **Install Water Filter (Applicable to some models only)**

■ **Before Installing water filter**

1. Before installing the filter, take out the top shelf of the refrigerator after tilting it to the direction (①) and lifting it to the direction (②) and move it to the lower part.
2. Remove the lamp cover by pressing the protrusion under the cover and pulling the cover to the front.





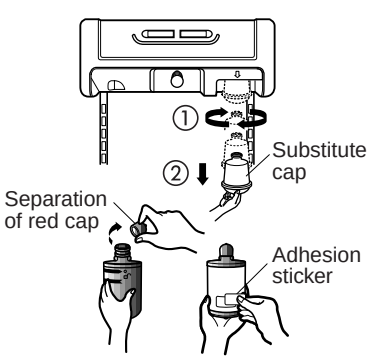
■ **Installing water filter**

1. **Initial installation of water filter**
   Remove the filter substitute cap by turning it counterclockwise (①) by 90 degrees and pulling it down.

Note : Keep it safe to use it later when you do not use the filter.

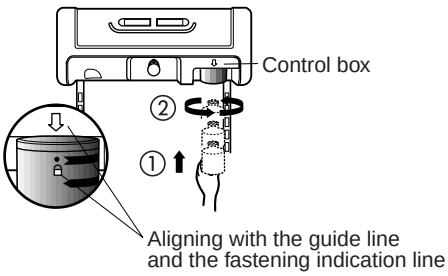
Remove the red cap from the filter and attach the sticker. Insert the upper part of the filter (①) after aligning with the guideline marked on the control box, and fasten it by turning it clockwise by 90 degrees.

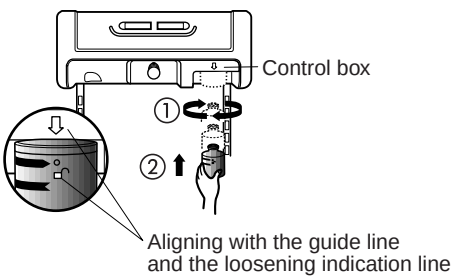
Note : Check that the guideline and the fastening indication line are aligned.



2. **Replacement of water filter**
   While holding the lower part of the filter, turn it counterclockwise (①) by 90 degrees and pull it down.

Note : Check that the guideline and the loosening indication line are aligned.



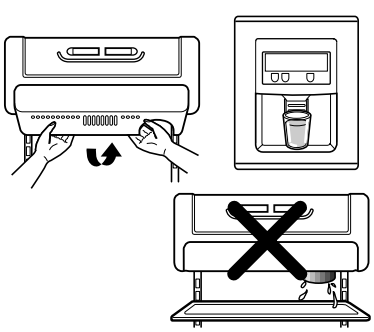


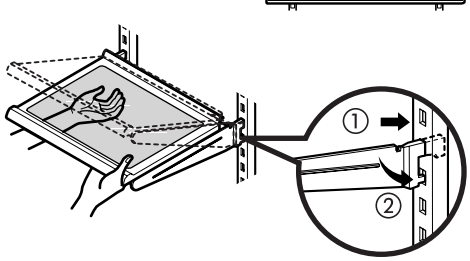
■ **After installing water filter**

Reassemble the lamp cover and the top shelf of the refrigerator. To place the top shelf of the refrigerator, raise the front part of the shelf a bit so that the hook of the shelf is fit into the groove.

In order to clean the water filter system, drain water for about 3 min.

Note : Then open the door of the refrigerator and check for water droppings on the shelf under the filter.



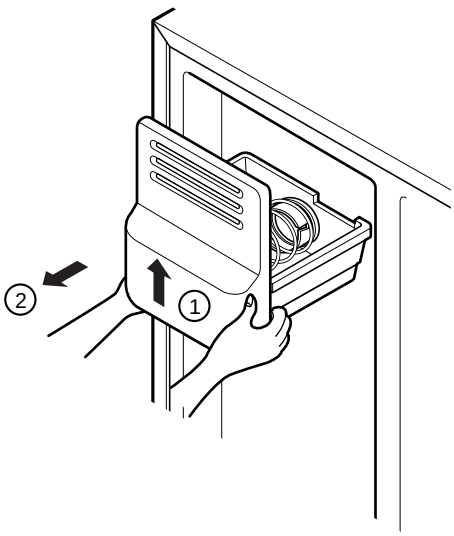


HOW TO INSTALL REFRIGERATOR

3. How to Control the Amount of Water Supplied to Icemaker.

3-1. Confirm the amount of water supplied to the icemaker.

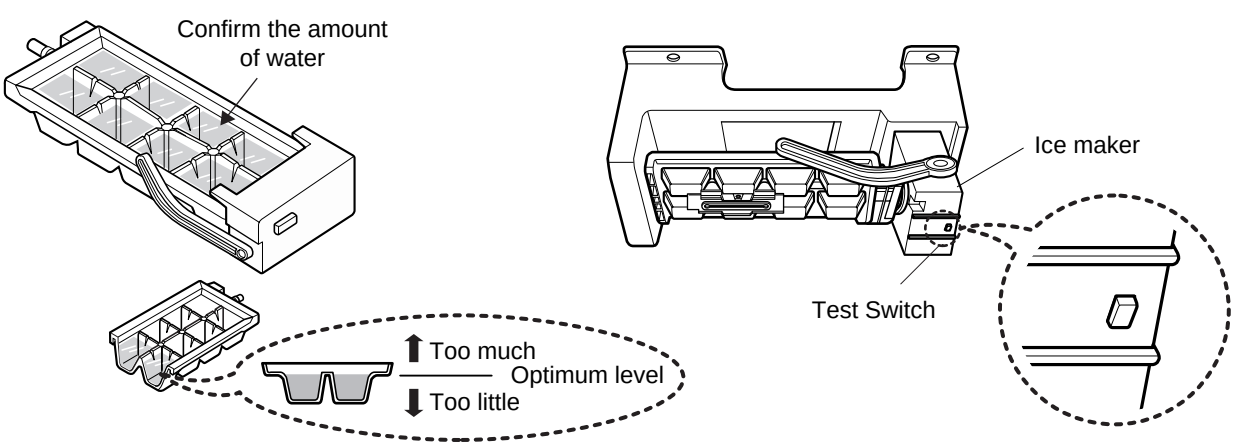
1. Pull out the ice bank in the upper part of the freezer compartment.



Caution : • Do not put hands or tools into the chute to confirm the operation of geared motor.
it may damage refrigerator or hurt hands.)
• Check the operation of motor with its operation noise.

2. Apply electricity after connecting water pipe.

1) Press test switch under the icemaker for two seconds as shown below.
2) The bell rings(ding~dong) and ice tray rotates and water comes out from the icemaker water tube.
3) The water shall be supplied two or three times into the tray. The amount of water supplied for each time is small.
Put a water container under the ice tray and press test switch.
4) When ice tray rotates, the water in it will spill. Collect the spilt water and throw away into the sink.
5) When ice tray has finished rotation, water comes out from the water tube. Confirm the amounts of water in the ice tray.
(refer to fig. The optimum amount of water is 110cc)



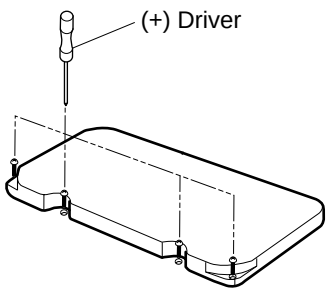
* It is acceptable if the adjusted level of water is a bit smaller than optimum level.

HOW TO INSTALL REFRIGERATOR

3-2. Control the amount of water supplied to the icemaker.

Caution : • Please unplug the power cord from the wall outlet and wait for more than three minutes before disconnecting PWB cover as 310V is applied in the control panel.

1. Disconnect PWB cover from the upper part of the refrigerator.



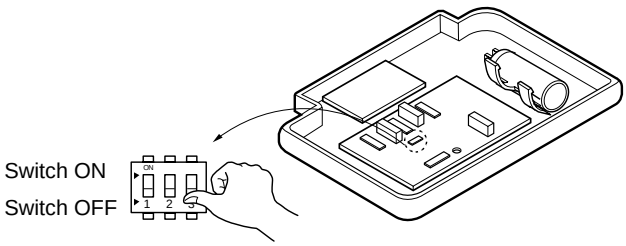
2. Adjust the amount of water supplied by using DIP switch.

■ **Water Supplying Time Control Option**

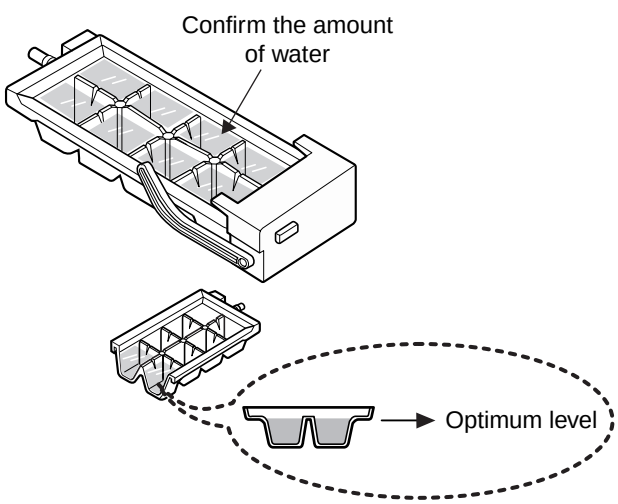
SWITCH NO			Water Suppling
S/W1	S/W2	S/W3	**Time**
OFF	OFF	OFF	6.5 Sec.
ON	OFF	OFF	5.5 Sec.
OFF	ON	OFF	6 Sec.
ON	ON	OFF	7 Sec.
OFF	OFF	ON	7.5 Sec.
ON	OFF	ON	8 Sec.
OFF	ON	ON	9 Sec.
ON	ON	ON	10 Sec.

1) The water supplying time is set at five seconds when the refrigerator is delivered.
2) The amount of water supplied depends on the setting time and water pressure (city water pressure).
3) If ice cube is too small, increase the water supplying time. This happens when too small water is supplied into the ice tray.
4) If ice cube sticks together, decrease the water supplying time. This happens when too much water is supplied into the ice tray.

Caution : When adjusting the amount of water supplied, adjust step by step. Otherwise the water may spill over.



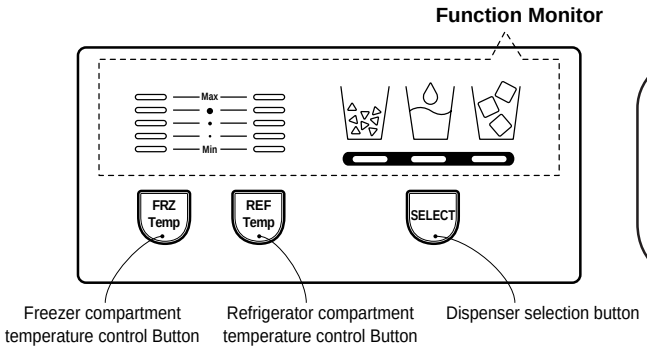
3. When adjustment of control switch for the amount of water supplied is complete, check the level of water in the ice tray.



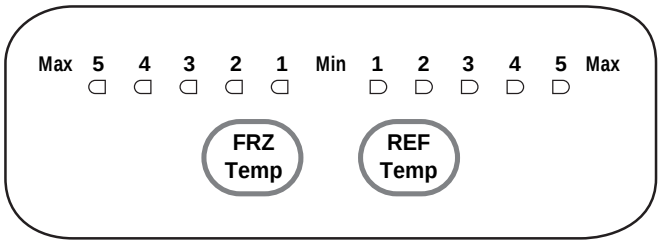
MICOM FUNCTION

1. Monitor Panel

1-1. GR-P247, GR-P207, GR-L247, GR-L207

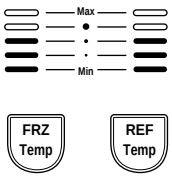
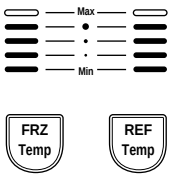
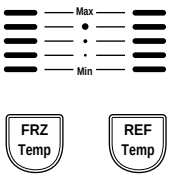
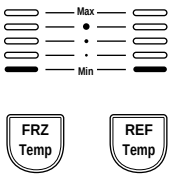
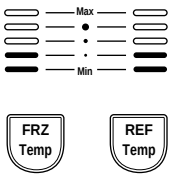


1-2. GR-C247, GR-C207, GR-B247, GR-B207



2. Description of Function

2-1. Funnction of Temperature Selection

Division	Power Initially On	1st Press	2nd Press	3th Press	4th Press
Change of Indication Lamp					
Temperature Control	Medium	Medium Max	Max	Min	Medium Min
Freezer Control	-19 °C (-18 °C)	-22 °C (-20.5 °C)	-23 °C (-22 °C)	-15 °C	-17 °C
Refrigeration Control	3 °C	1.5 °C	0°C	6 °C (7 °C)	4.5 °C

* The temperature can vary ±3 °C depending on the load condition. *( ) : 127V/60Hz, 110~115V/60Hz, 115V/60Hz Rating ONLY.

1. When power is initially applied or reapplied after power cut, “Medium” is automatically selected.
2. When the temperature selection switch in the freezer and refrigerator compartments is pressed, the light is on in the following sequence:
   "Medium" → "Medium Max" → "Max" → "Min" → "Medium Min" → "Medium"
3. The temperature setting condition of freezer and refrigerator compartments shall not be indicate in the standard model (GR-P247, GR-P207, GR-L247, GR-L207, GR-C247, GR-C207, GR-B247, GR-B207) when refrigerator or home bar door is closed.

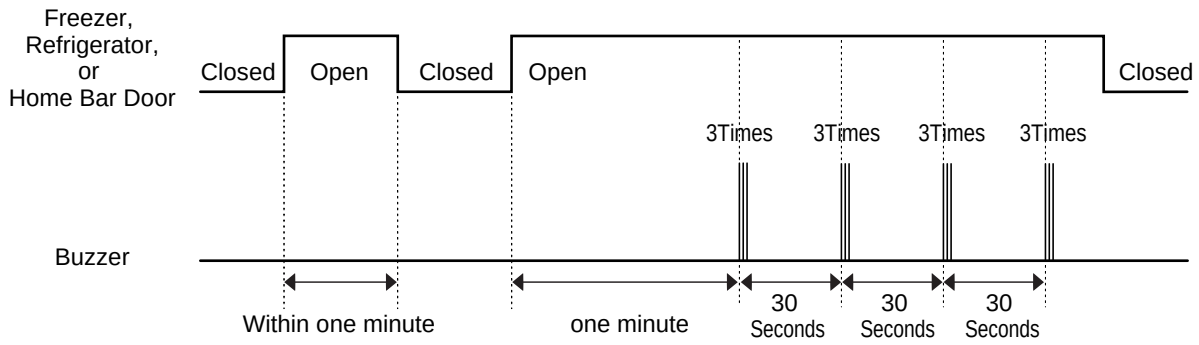
MICOM FUNCTION

2-2. Control of Variable Speed Fan in the Refrigerator Compartment

1. Fan motor in the freezer compartment shall change from standard to high speed rpm in order to increase cooling speed and load corresponding speed.
2. High speed rpm is only used for the initial power application and load corresponding operation. But standard rpm is used in the general working conditions.
3. Fan motor in the freezer compartment operates normally when freezer, refrigerator, or home bar door opens and fan motor in the freezer compartment operates (the speed changes from high to standard rpm if fan motor operates at high speed rpm). But fan motor in the freezer compartment stops when refrigerator or home bar door is open and refrigerator compartment door is closed.

2-3. Door Opening Alarm

1. Buzzer warns when freezer, refrigerator, or home bar door is kept open for more than 1 minute.
2. Buzzer warns 3 times at 0.5 second interval and then 3 times at 0.5 second on and off in every 30 seconds if door is kept open for more than 1 minute.
3. Warning is released when freezer, refrigerator, or home bar door is closed during door opening alarm.



2-4 Button Selection Buzzer Sound

1. “Bell” sounds when button on the front display is pressed.

2-5. Forced Start, Forced Defrost Buzzer Warning

1. When test button in the main PWB is pressed, “beep” sounds.
2. When forced start is selected, warning sounds three times for 0.2 second on and 1.8 seconds off.
3. When forced defrost is selected, warning sounds three times in the following cycle: 0.2 second on and 0.2 second off, 0.2 second on and 0.2 second off, and 0.2 second on and 1.0 second off.

2-6. Functions of Defrost

1. Defrost starts whenever the compressor operation time accumulates to seven to seven and a half hours.
2. Defrost starts whenever the compressor operation time accumulates to four to four and a half hours if power is initially applied (or reapplied after power cut).
3. Defrost completes when the temperature of defrost sensor reaches at 5 °C. Faulty defrost is indicated if the defrost sensor does not reach at 5 °C after 2 hours of defrosting.
4. Defrost does not work when defrost sensor is out of order (wire cut or short-circuit).

MICOM FUNCTION

2-7. Electric Equipment Sequential Operation

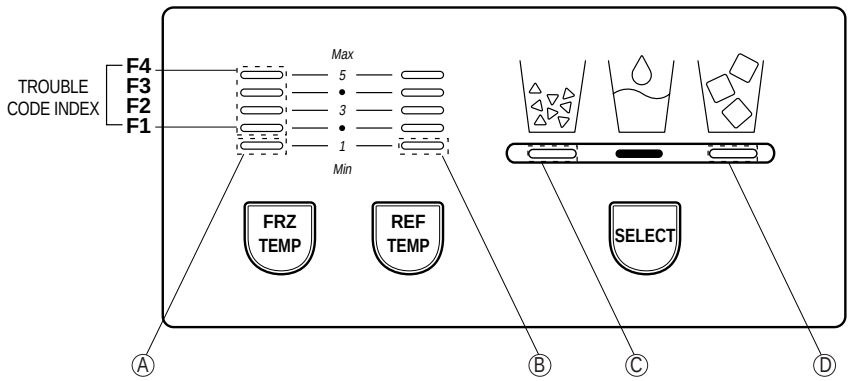
Electric equipment such as compressor, defrost heater, cooling fan, step motor damper, etc. operates in the following sequence when power is initially applied and test is completed in order to reduce noise and parts damage.

Function		Operation Sequence	Remarks
When power is initially applied	Defrost sensor temperature is above 10 °C (purchased or house-moving)	POWER ON → (0.5 sec.) COMP ON → (0.3 sec.) FAN 1400 (High Speed Operation) ON → (0.3 sec.) STEP MOTOR DAMPER ON → (0.3 sec.) HOME BAR HEATER ON	If there is any error in functions, initial starting does not work.
	Defrost sensor temperature is below 10 °C (power cut or service)	POWER ON → (0.5 sec.) DEFROST HEATER ON → (8 sec.) DEFROST HEATER OFF → (0.3 sec.) HOME BAR HEATER ON → (5 sec.) HOME BAR HEATER OFF → (0.3 sec.) WATER TANK HEATER ON → (5 sec.) WATER TANK HEATER OFF → (0.3 sec.) COMP ON → (27 sec.) FAN 1170 (Standard Operation) ON → (0.3 sec.) STEP MOTOR DAMPER ON	
TEST MODE	Test Mode 1 (Forced Start)	TEST S/W (Press Once) → OTHER LOADS OFF → (0.3 sec.) COMP ON → (0.3 sec.) FAN 1400 (High Speed Operation) ON → (0.3 sec.) STEP MOTOR DAMPER ON	If switch is pressed one more or defrost sensor temperature is above +5 °C, it returns to test mode and restarts. (compressor shall operate after 7 minutes)
	Test Mode 2 (Check Freezer fan)	TEST S/W (Press Twice) → COMP OFF → (0.3 sec.) FAN 1400 (High Speed Operation) OFF → (0.3 sec.) FAN 1170 (Standard Operation) ON → (0.3 sec.) STEP MOTOR DAMPER OPEN	
	Test Mode 3 (Forced defrost)	TEST S/W (Press Three Times) → FAN 1170 (Standard Operation) OFF → (0.3 sec.) DEFROST HEATER ON → (0.3 sec.) STEP MOTOR DAMPER CLOSE	

MICOM FUNCTION

2-8. Function of Trouble Diagnosis

1. Function of trouble diagnosis is to make the repair service easy when the refrigerator is out of order during service.
2. The function control button does not work but the recognition sound is heard when the refrigerator is out of order.
3. It returns to normal conditions when trouble code led is off. (reset)
4. Trouble code is indicated by the freezing temperature indicator led in the refrigerator display. All leds except trouble code are off.

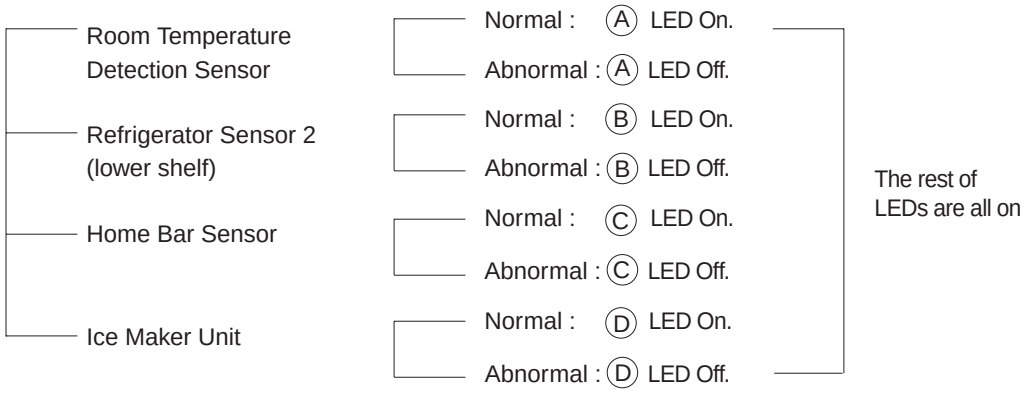


◐ : On ● : Off ● : Normal

No.	Trouble	Trouble Code Indicator				Troubles	Operation conditions during Trouble			
		F4	F3	F2	F1		Compressor	Freezer Fan	Defrost Heater	Step motor Damper
1	Abnormal Freezer sensor.	●	●	●	◐	Freezer sensor short	15 min. on/ 15 min. off	Standard RPM	●	●
2	Abnormal Refrigerator sensor 1 (R1) (Upper part in the refrigerator compartment)	●	●	◐	●	Refrigerator sensor 1 short circuit	●	Standard RPM	●	Note 2)
3	Abnormal Refrigerator sensor 2 (lower part in the refrigerator compartment)	Note 1)				Refrigerator sensor 2 short circuit	●	Standard RPM	●	●
4	Abnormal Defrost sensor	●	◐	●	●	Defrost sensor short circuit	●	Standard RPM	No defrosting	●
5	Failed defrosting	◐	◐	◐	◐	Defrost Heater, Temperature Fuse short circuit. Unplugged Connector (Indicated 4 hour later after trouble)	●	Standard RPM	●	●
6	Abnormal Open Air Temperature Detecting sensor	Note 1)				Open air temperature detecting sensor short circuit	●	●	●	
7	Abnormal ice making sensor	Note 1)				Defrost sensor short circuit.	●	●	●	●
8	Abnormal ice maker unit	Note 1)				Faulty Ice Maker Unit Motor or Hall IC, L/Wire short circuit. Faulty motor driving circuit.	●	Standard RPM	●	●

MICOM FUNCTION

Note 1) When open air temperature detecting sensor, refrigerator sensor 2, ice maker unit, ice making sensor are abnormal, it is not indicated in the trouble code. But it is indicated while checking LED (press freezer and refrigerator temperature control buttons for more than 1 second at the same time).


Room Temperature Detection Sensor
Refrigerator Sensor 2 (lower shelf)
Home Bar Sensor
Ice Maker Unit
Normal : Ⓐ LED On.
Abnormal : Ⓐ LED Off.
Normal : Ⓑ LED On.
Abnormal : Ⓑ LED Off.
Normal : Ⓒ LED On.
Abnormal : Ⓒ LED Off.
Normal : Ⓓ LED On.
Abnormal : Ⓓ LED Off.
The rest of LEDs are all on

Note 2) When refrigerator sensor is abnormal, it opens for 10 minutes and closes for 15 minutes.

2-9. Test Function

1. Test function is to check the function of PWB and products and to find defective parts when the refrigerator is out of order.
2. Test button is on the main PWB of the refrigerator. Test mode completes after 2 hours in maximum and returns to normal conditions.
3. Function control button does not work but button recognition sound is heard during the test mode.
4. When test mode is completed, unplug and replug the power cord to return to the normal conditions.
5. When sensor is abnormal in the test mode, test mode is released and trouble code is indicated.
6. Test mode does not work even test button is pressed when trouble code indicator is on.

Mode	Operation	Contents	Remarks
Test 1	Press test button once	1. Continuous compressor operation 2. Continuous freezer fan (high rpm) operation 3. Defrost heater off. 4. All display LEDs are on. 5. Electronic stepping motor damper open (baffle is open).	Forced start
Test 2	Press test button once in Test Mode 1	1. Compressor off. 2. Freezer fan (high rpm) off. 3. Freezer fan (standard rpm) on. 4. Defrost heater off. 5. “Medium Weak” led in freezer and refrigerator temperature indicators are on. 6. Step motor damper open condition (baffle is open)	Check fan in the freezer compartment
Test 3	Press test button once in Test Mode 2	1. Compressor is off. 2. Freezer fan off. 3. Defrost heater on. 4. “Medium” leds in freezer and refrigerator temperature indicators are on. 5. Step motor damper closed condition (baffle is open)	• Return to normal conditions when defrost sensor is above 5 °C. • Forced defrost.
Normal	Press test button onec in test mode 3	Return to initial conditions	Compressor starts after seven minutes.

MICOM FUNCTION

* LED check function- When freezer and refrigerator temperature control buttons are pressed for more than 1 second at the same time, all LEDS on the display are on. And it returns to the normal conditions when the buttons are released.
* Check of freezer fan rpm variation- Freezer fan speed changes from high speed to standard speed and vice versa for 30 seconds whenever freezer and refrigerator temperature control buttons are pressed at the same time for more than 1 second when freezer fan is in operation and returns to the previous rpm.

2-10. Functions of Ice Dispenser and Water Dispenser

1. Ice and cold water are available without opening refrigerator door.

2. The desired ice (crushed or cube) or cold water are dispensed when dispenser press button (rubber button) is pressed after selection of ice or cold water. When ice is selected, duct door opens by electric solenoid when dispenser press switch is pressed. When dispenser press switch is released, duct door closes after it opens for 5 seconds.

3. Ice and water dispensing function stops when freezer door is open.

4. Geared motor and solenoid are automatically off if there is no signal after 3 minutes when ice (crushed and cube) or water is selected and dispenser switch is pressed down. Solenoid (duct door) stops after 5 seconds when solenoid is off. (in order to protect short circuit from solenoid heat generation)

5. Dispenser Lamp On/Off Function. The dispenser lamp shall be on or off whenever dispenser button is pressed or released, respectively after selection of ice (crushed or cube) or water.

6. Water/Crushed Ice/Cube Ice Selection function
   1) It is to select water/crushed ice/cube ice by user from the function control part and it will be indicated and selected by pressing button.
   2) Crushed ice is automatically selected when power is initially on.
   3) When crushed ice is selected and its button is pressed, geared motor operates and crushed ice is dispensed.
   4) When cube ice is selected and its button is pressed, geared motor and ice solenoid operate and cube ice is dispensed.

7. Function of Water Dispenser
   1) When user selects water in the function control parts, it is indicated in the LED and water is selected.
   2) Water dispenser is a direct tap water connection type. The water solenoid valve on the right of machine room opens and water dispenses when user selects water and presses button.

MICOM CIRCUIT DESCRIPTION

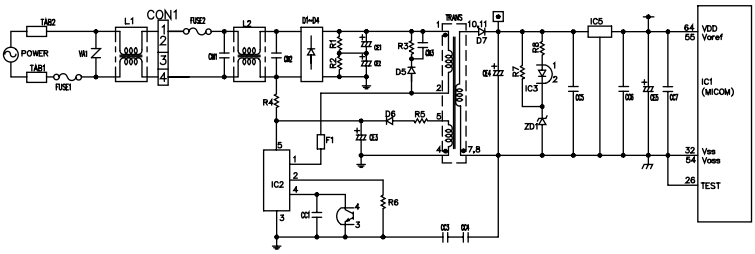
1. Description of PWB Circuit

1-1. Power Circuit

1. GR-P247, GR-P207, GR-L247, GR-L207

Power circuit is composed of switching mode power supply (SMPS) electric parts. SMPS is composed of rectifying part (D1~D4, CE1) which converts AC to DC voltage, switching part (IC2) which switches this converted DC voltage, trans which transmits primary energy to secondary energy, secondary power source which transmits power to MICOM and IC, and feed back part (IC3, ZD1) which feeds back voltage to primary trans in order to maintain constant secondary voltage.
The voltages at each part are as follows.

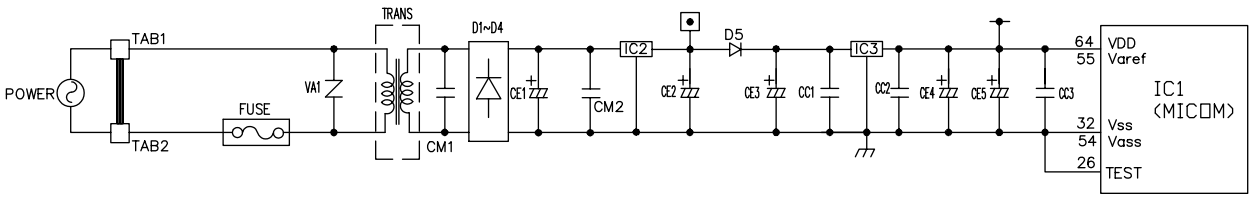
Note : If circuit is abnormal, repair it after 3 minutes when power cord is unplugged. Be care of electric shock as high voltage (DC 310 V) is applied to the circuit.



2. GR-C247, GR-C207, GR-B247, GR-B207

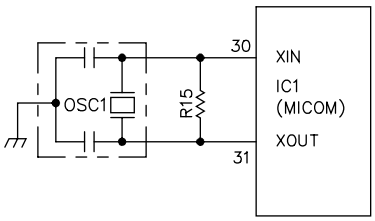
In the trans secondary side is composed of power source (12 Vdc) for driving relay and power source (5 Vdc) which supplies power to MICOM and IC. Voltages in each part are as follows.

Position	VA1	CM1	CM2	CE2	CE4
Voltage	220 Vac	14 Vac	17 Vac	12 Vdc	5 Vdc



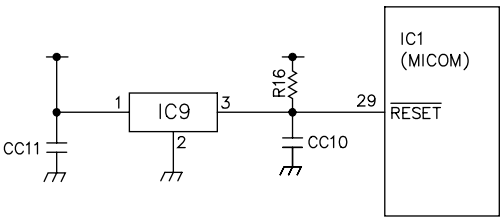
1-2. Oscillation Circuit

This is to generate basic time for synchronous clock and time calculation for internal logic element to send and receive information.Standard parts should be used as the time calculated by IC1 shall be changed or shall not work if OSC1 specification is changed.



1-3. Reset Circuit

Reset circuit is to initialize RAM in MICOM (IC1) and make all functions to start from the initial conditions when power is nitially applied or power is reapplied to MICOM after power cut. Low voltage is applied for 10 ms to the reset terminal of MICOM when power is applied. 5 voltage is applied to the reset terminal for general operation. (MICOM does not work when IC9(Reset IC) is failed)



MICOM CIRCUIT DESCRIPTION

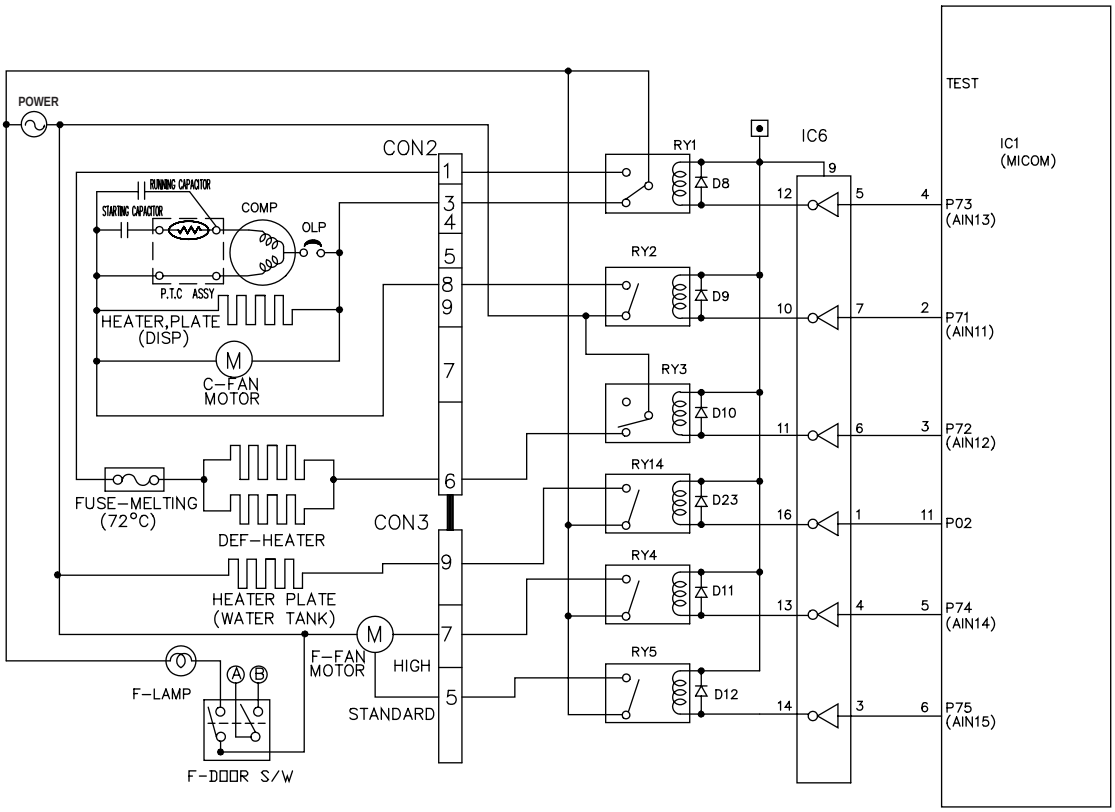
1-4. Load/Dispenser Operation, Buzzer Driving, Door Opening Detecting Circuit

1. LOAD DRIVING CIRCUIT

* Freezer fan motor shall stop when freezer or refrigerator door is open. Freezer fan motor shall immediately operate when freezer or refrigerator door is closed.
* Door switches A, B, C, D, E, F of freezer and refrigerator are connected to the door opening detecting circuit in Micom.
* Home bar door switch E, F is parallelly connected to the refrigerator door switch C, D. Therefore it can detect door opening when one of the door is open.

1) GR-P247, GR-P207, GR-L247, GR-L207

Load Types		Machine Room	Defrost Heater	AC Converting Relay	Heater, Plate (W/TANK)	Refrigerator Fan Motor	
						High Speed	Standard Speed
Measuring Locations(IC 6)		No.10	No.11	No.12	No.16	No.13	No.14
Condition	ON	Below 1 V					
	OFF	12 V					

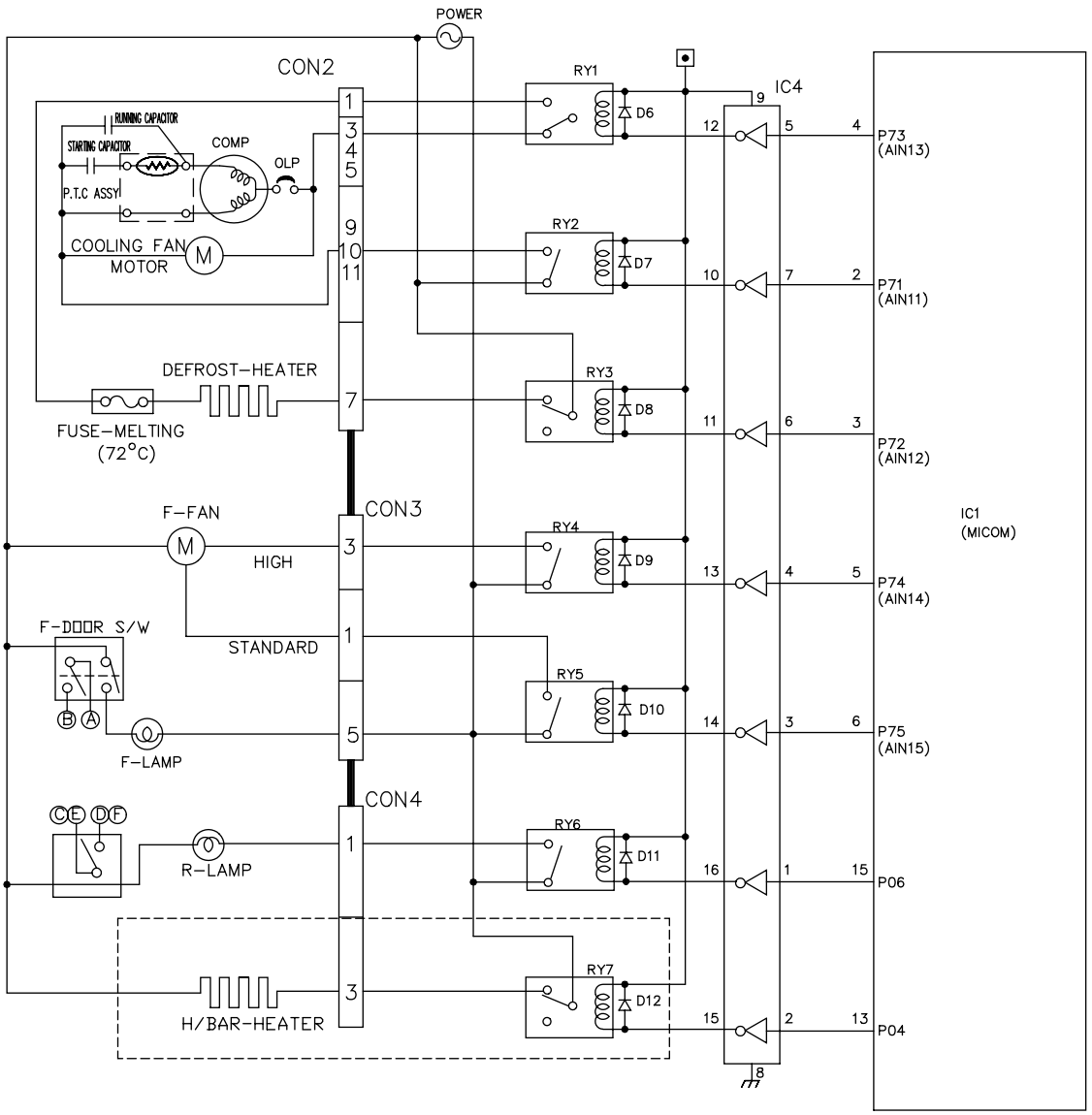


MICOM CIRCUIT DESCRIPTION

2) GR-C247, GR-C207, GR-B247, GR-B207

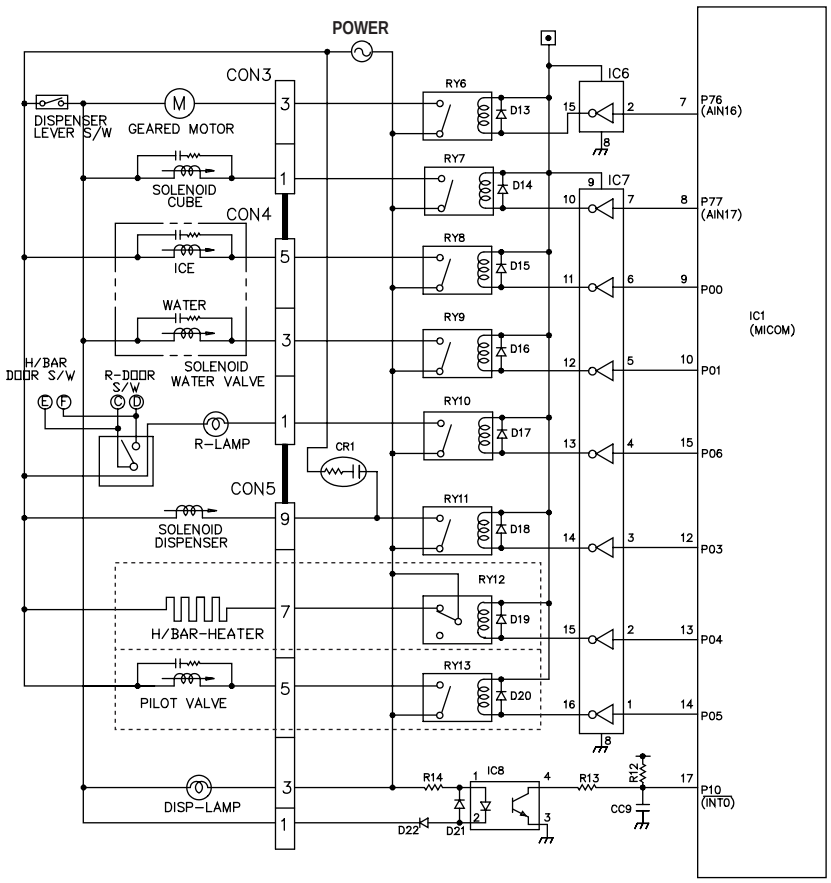
* Freezer fan motor shall operate when freezer, refrigerator, or home bar door is open.
* Door switches A, B, C, D of freezer and refrigerator are connected to door opening detecting circuit in Micom.
* Home bar door switch E, F is parallelly connected to the refrigerator switch C, D. Therefore it can detect door opening when one of the door is open.

Load Types		Machine Room	Defrost Heater	AC Converting Relay	Refrigerator Compartment Lamp	Home Bar Heater	Refrigerator Fan Motor	
							High Speed	Standard Speed
Measuring Points(IC 4)		No.10	No.11	No.12	No.16	No.15	No.13	No.14
Conditions	ON	Below 1 V						
	OFF	12 V						



MICOM CIRCUIT DESCRIPTION

2. Dispenser Operation Circuits
GR-P247, GR-P207, GR-L247, GR-L207



1) LOAD DRIVING CONDITION CHECK

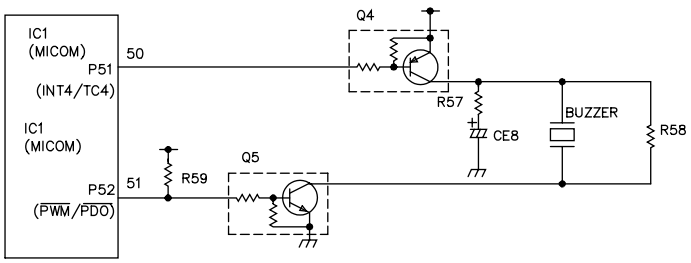
LOAD TYPE		GEARED MOTOR	SOLENOID CUBE	WATER VALVE			SOLENOID DISPENSER	HOME BAR HEATER	Refrigerator Compartment Lamp
				ICE	WATER	PILOT			
Measuring Points		No.15(IC6)	No.10(IC7)	No.11(IC7)	No.12(IC7)	No.16(IC7)	No.14(IC7)	No.15(IC7)	No.13(IC7)
Conditions	ON	Below 1V							
	OFF	12V							

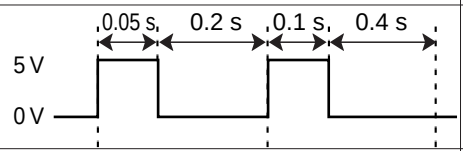
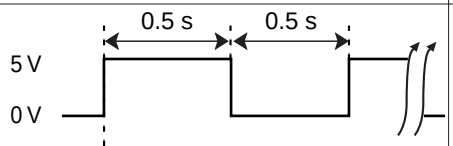
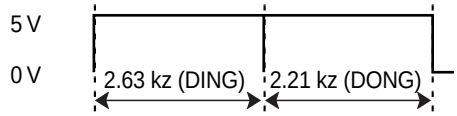
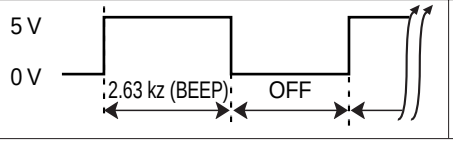
2) Lever Switch Detecting Circuit

Measuring Points / Lever S/W	IC1(Micom) No. 17
On(Press)	5V / 0V (60Hz)
OFF	5V

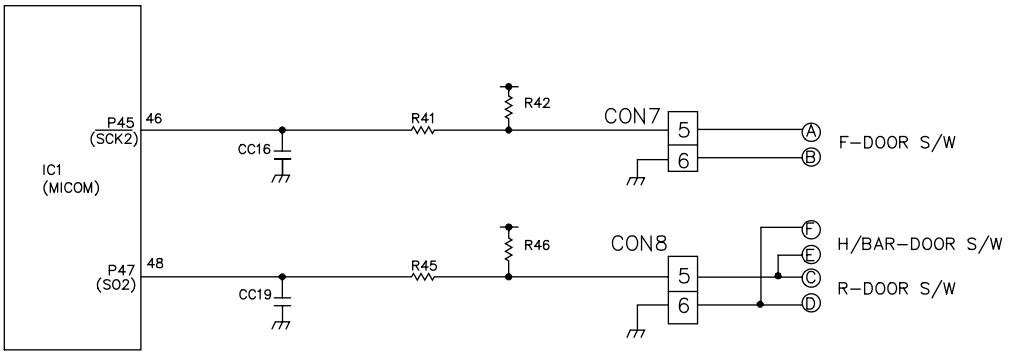
MICOM CIRCUIT DESCRIPTION

3. Buzzer Driving Circuits



CONDITIONS / MEASURING POINTS	Bell sounds when button on dosplay is pressed.	Beep sounds when warning door opening.	OFF
IC1 (No. 50 Pin)			0 V
IC1 (No.51 Pin)			0 V

4. Door Opening Detecting Circuits



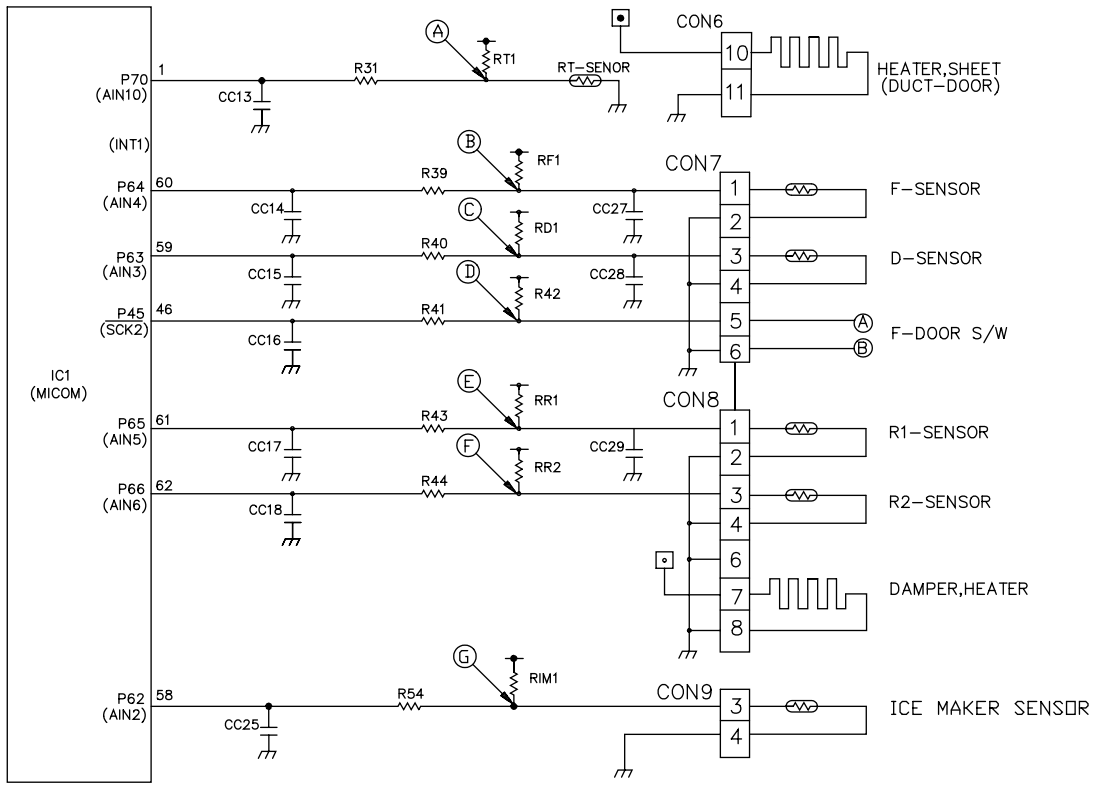
MEASURING POINTS / FREEZER / REFRIGERATOR DOOR	IC1 (MICOM) (Pin No. 46 and 48)
CLOSED	5 V (A - B, C - D, E - F both ends S/W off conditions)
OPEN	0 V (A - B, C - D, E - F both ends S/W on conditions)

* Door opening detecting switch (A - B) can not detect door opening when switch (A - B) or lead wire is failed even though freezer door switch is normal.

* Refrigerator lamp shall not be on when refrigerator door switch can not detect door opening detecting switch (C - D) or home bar door switch (E - F).

MICOM CIRCUIT DESCRIPTION

1-5. Temperature Detecting Circuit, Duct Door Heat Working Circuit



The above circuit is fixed in the freezer compartment sensor, refrigerator compartment sensor, ice making sensor, and defrost sensor. The condition of short or open of each temperature sensor is as follows.

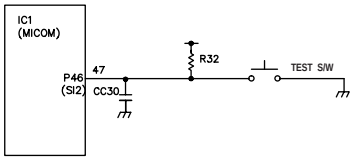
SENSOR	CHECK POINT	NORMAL(-30 °C ~ 50 °C)	SHORT	OPEN
OPEN AIR SENSOR	POINT Ⓐ Voltage	0.5 V~4.5 V	0 V	5 V
FREEZER SENSOR	POINT Ⓑ Voltage			
DEFROST SENSOR	POINT Ⓒ Voltage			
REFRIGERATOR SENSOR 1	POINT Ⓔ Voltage			
REFRIGERATOR SENSOR 2	POINT Ⓕ Voltage			
DEFROST SENSOR	POINT Ⓖ Voltage			

* 12 Vdc shall be applied to No. 10 and 11 terminals of CON6 as duct door heater is always on.

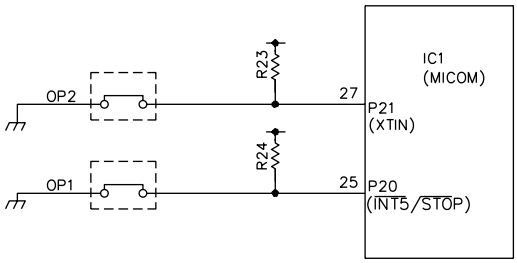
MICOM CIRCUIT DESCRIPTION

1-6. Switch Input Circuits

The following circuit is an input circuit to detect the test switch for refrigerator detection and to detect the signal of electronic single motor damper reed switch.



1-7. Option Designation Circuit (Model Classifying Function)

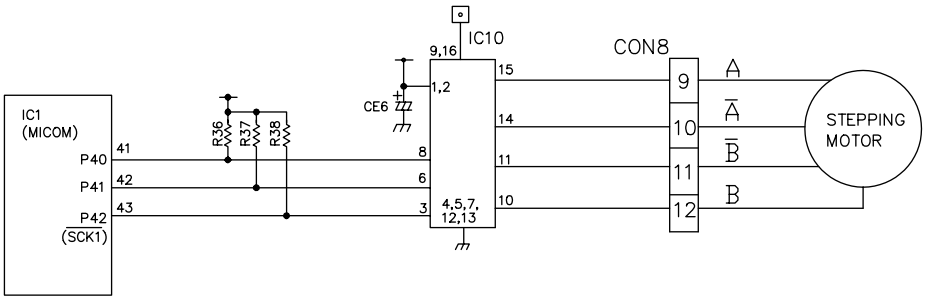


The above circuit is to designate model by option and inform it to MICOM. The option designation and application standard for each model is as follows.

Classification	Connection Conditions	Application Standard
OP1	Connection	Other area (Changable)
	Cut	Domestic
OP2	Connection	Model with dispenser
	Cut	Model without dispenser

▶ This circuit is fixed in the factory before shipment. Do not add or remove option at your discretion.

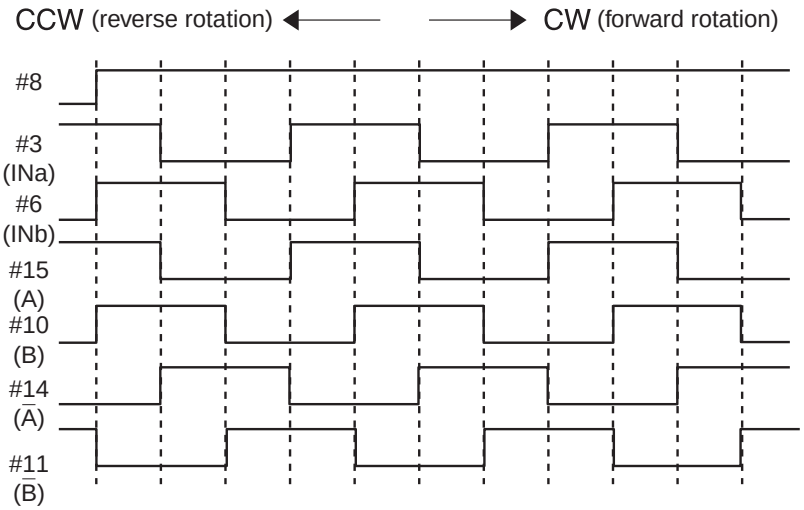
1-8. Stepping Motor Working Circuit



Motor rotates as rotating magnetic forms on the coils wound on each phase of stator when Micom pin No. 41 applies “High” signal to IC6 (TA774AP) and Micom pin No. 42 and 43 produces “High” and ‘Low” signals.

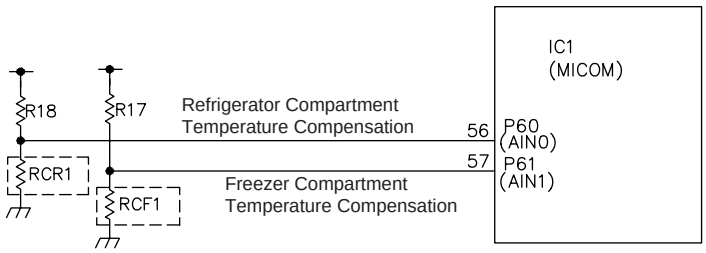
MICOM CIRCUIT DESCRIPTION

Description) MICOM Pin No. 41, 42, and 43 terminals send signals of which wave form are shown on the right in 3.33 msec cycles. These signals pass through input terminals (No. 3, 6, and 8) of motor driving IC6 (TA7774AP) and are sent to the output terminal (No. 10, 11, 14, 15). These output signals form rotating magnetic on the coils wound on each phase of stator and motor rotates. When signals are input to INa and INb of motor driving IC (TA774AP), rotating magnetic forms on the coils wound on each phase of stator and stepping motor damper rotates.



1-9. Temperature Compensation and Over Cooling/Weak Cooling Compensation Circuit

1. Freezer and refrigerator compartment temperature compensation



Freezer Compartment		Refrigerator Compartment		Remarks
Resistance value (RCF1)	Temperature Compensation	Resistance value (RCR1)	Temperature Compensation	
180 kΩ	+5 °C	180 kΩ	+2.5 °C	Compensate to warm ↑
56 kΩ	+4 °C	56 kΩ	+2.0 °C	
33 kΩ	+3 °C	33 kΩ	+1.5 °C	
18 kΩ	+2 °C	18 kΩ	+1.0 °C	
12 kΩ	+1 °C	12 kΩ	+0.5 °C	
10 kΩ	0 °C	10 kΩ	0 °C	Reference temperature
8.2 kΩ	-1 °C	8.2 kΩ	-0.5 °C	↓ Compensate to cool
5.6 kΩ	-2 °C	5.6 kΩ	-1.0 °C	
3.3 kΩ	-3 °C	3.3 kΩ	-1.5 °C	
2 kΩ	-4 °C	2 kΩ	-2.0 °C	
470 Ω	-5 °C	470 Ω	-2.5 °C	

• Temperature Compensation Table by Resistance Adjustment (the difference compared to the present temperature)

EX) The temperature of refrigerator increases by 1 °C if refrigerator compartment compensation resistance is changed from 10 kΩ to 18 kΩ.

MICOM CIRCUIT DESCRIPTION

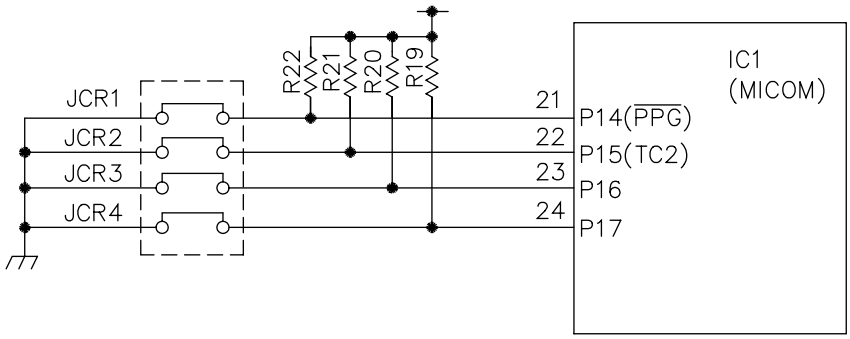
▶ Refrigerator compartment temperature compensation table is as shown below.

	Amended Resistance / Present Resistance	470 Ω	2 kΩ	3.3 kΩ	5.6 kΩ	8.2 kΩ	10 kΩ	12 kΩ	18 kΩ	33 kΩ	56 kΩ	180 kΩ
Refrigerator Compartment (RCR1)	470Ω	No change	0.5 °C Increase	1 °C Increase	1.5 °C Increase	2 °C Increase	2.5 °C Increase	3 °C Increase	3.5 °C Increase	4 °C Increase	4.5 °C Increase	5 °C Increase
	2 kΩ	0.5 °C Decrease	No change	0.5 °C Increase	1 °C Increase	1.5 °C Increase	2 °C Increase	2.5 °C Increase	3 °C Increase	3.5 °C Increase	4 °C Increase	4.5 °C Increase
	3.3 kΩ	1 °C Decrease	0.5 °C Decrease	No change	0.5 °C Increase	1 °C Increase	1.5 °C Increase	2 °C Increase	2.5 °C Increase	3 °C Increase	3.5 °C Increase	4 °C Increase
	5.6 kΩ	1.5 °C Decrease	1 °C Decrease	0.5 °C Decrease	No change	0.5 °C Increase	1 °C Increase	1.5 °C Increase	2 °C Increase	2.5 °C Increase	3 °C Increase	3.5 °C Increase
	8.2 kΩ	2 °C Decrease	1.5 °C Decrease	1 °C Decrease	0.5 ° Drop	No change	0.5 °C Increase	1 °C Increase	1.5 °C Increase	2 °C Increase	2.5 °C Increase	3 °C Increase
	10 kΩ	2.5 °C Decrease	2 °C Decrease	1.5 °C Decrease	1 °C Decrease	0.5 °C Decrease	No change	0.5 °C Increase	1 °C Increase	1.5 °C Increase	2 °C Increase	2.5 °C Increase
	12 kΩ	3 °C Decrease	2.5 °C Decrease	2 °C Decrease	1.5 °C Decrease	1 °C Decrease	0.5 °C Decrease	No change	0.5 °C Increase	1 °C Increase	1.5 °C Increase	2 °C Increase
	18 kΩ	3.5 °C Decrease	3 °C Decrease	2.5 °C Decrease	2 °C Decrease	1.5 °C Decrease	1 °C Decrease	0.5 °C Decrease	No change	0.5 °C Increase	1 °C Increase	1.5 °C Increase
	33 kΩ	4 °C Decrease	3.5 °C Decrease	3 °C Decrease	2.5 °C Decrease	2 °C Decrease	1.5 °C Decrease	1 °C Decrease	0.5 °C Decrease	No change	0.5 °C Increase	1 °C Increase
	56 kΩ	4.5 °C Decrease	4 °C Decrease	3.5 °C Decrease	3 °C Decrease	2.5 °C Decrease	2 °C Decrease	1.5 °C Decrease	1 °C Decrease	0.5 °C Decrease	No change	0.5 °C Increase
	180 kΩ	5 °C Decrease	4.5 °C Decrease	4 °C Decrease	3.5 °C Decrease	3 °C Decrease	2.5 °C Decrease	2 °C Decrease	1.5 °C Decrease	1 °C Decrease	0.5 °C Decrease	No change

- Temperature adjustment of refrigerator compartment is conducted by the same way as that of refrigerator. The temperature compensation of freezer is twice of refrigerator.
- This circuit is to input the degree of temperature compensation to MICOM in order to adjust the temperature of refrigerator.

MICOM CIRCUIT DESCRIPTION

2. Refrigerator Weak Cooling and Over Cooling Compensation Circuit



	Temperature Compensation by Cutting	
JCR1	+1 ¡	+2 ¡
JCR2	+1 ¡	
JCR3	-1 ¡	-2 ¡
JCR4	-1 ¡	

WEAK COOLING COMPENSATION		OVER COOLING COMPENSATION		REFRIGERATOR COMPARTMENT TEMPERATURE COMPENSATION	REMARKS
JCR3	JCR4	JCR1	JCR2		
				0 °C (FACTORY SHIPPING)	
CUT				-1 °C	
	CUT			-1 °C	
		CUT		+1 °C	
			CUT	+1 °C	
CUT	CUT			-2 °C	
		CUT	CUT	+2 °C	
CUT		CUT		0 °C	
CUT			CUT	0 °C	
	CUT	CUT		0 °C	
	CUT		CUT	0 °C	
CUT	CUT	CUT		-1 °C	
	CUT	CUT	CUT	+1 °C	
CUT	CUT	CUT	CUT	0 °C	

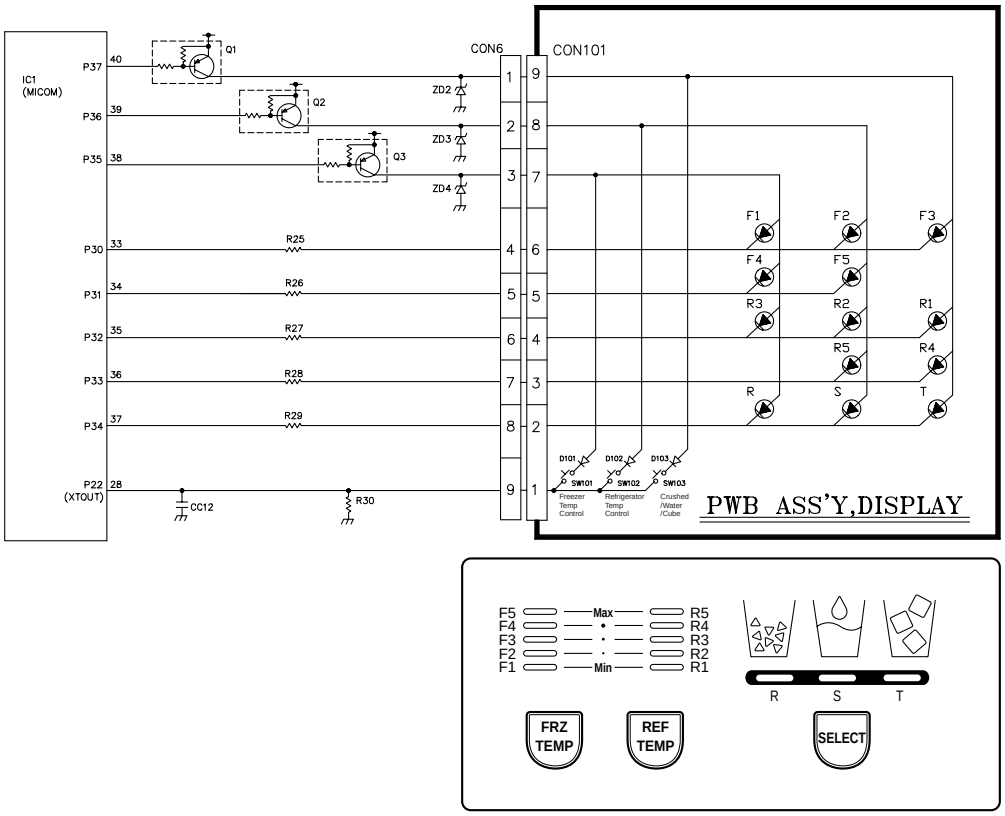
• The above option circuit is to compensate the refrigerator compartment temperature by cutting during service.

MICOM CIRCUIT DESCRIPTION

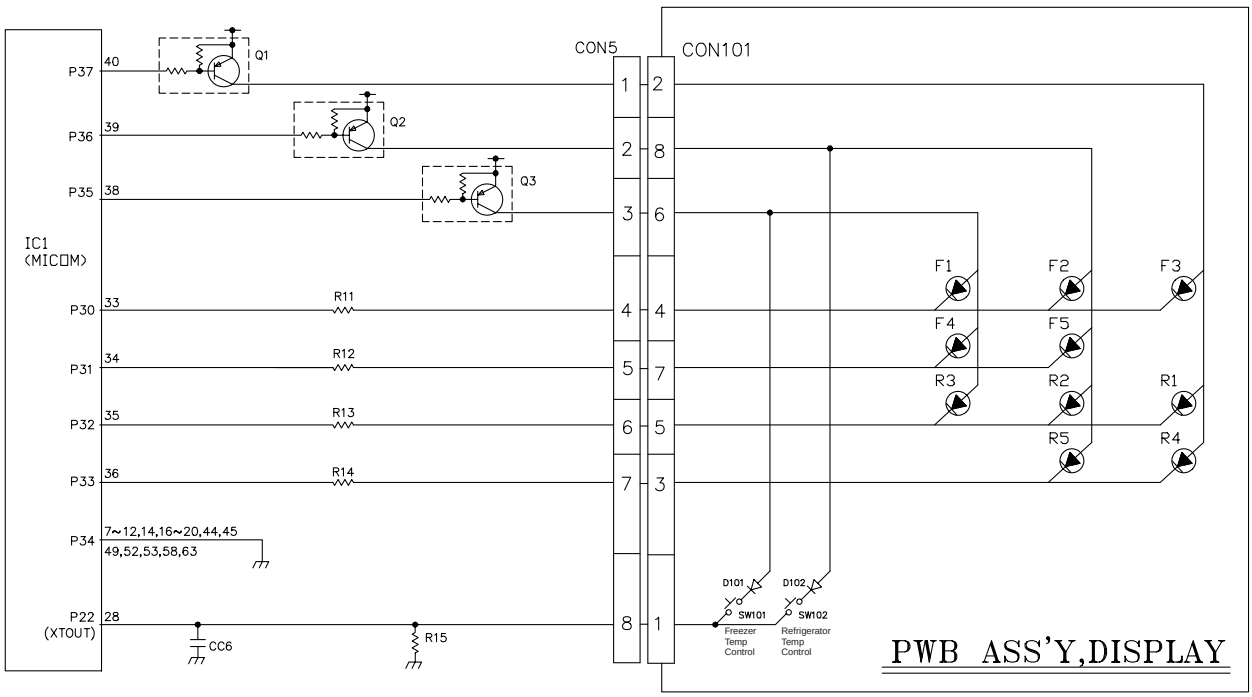
1-10. Key Button Input and Display Lighting Circuit

1. GR-P247, GR-P207, GR-L247, GR-L207

This circuit is to judge the work of function control button on the operation panel and to light each function indication led (LED module). It is driven by SCAN method.



2. GR-C247, GR-C207, GR-B247, GR-B207



MICOM CIRCUIT DESCRIPTION

2. Sensor Resistance Characteristic Table

Measured Temperature (°C)	Freezer Sensor	Refrigerator Sensor 1 and 2, Defrost Sensor and Open Air Sensor
-20 °C	22.3 kΩ	77 kΩ
-15 °C	16.9 kΩ	60 kΩ
-15 °C	13.0 kΩ	47.3 kΩ
-5 °C	10.1 kΩ	38.4 kΩ
0 °C	7.8 kΩ	30 kΩ
+5 °C	6.2 kΩ	24.1 kΩ
+10 °C	4.9 kΩ	19.5 kΩ
+15 °C	3.9 kΩ	15.9 kΩ
+20 °C	3.1 kΩ	13 kΩ
+25 °C	2.5 kΩ	11 kΩ
+30 °C	2.0 kΩ	8.9 kΩ
+40 °C	1.4 kΩ	6.2 kΩ
+50 °C	0.8 kΩ	4.3 kΩ

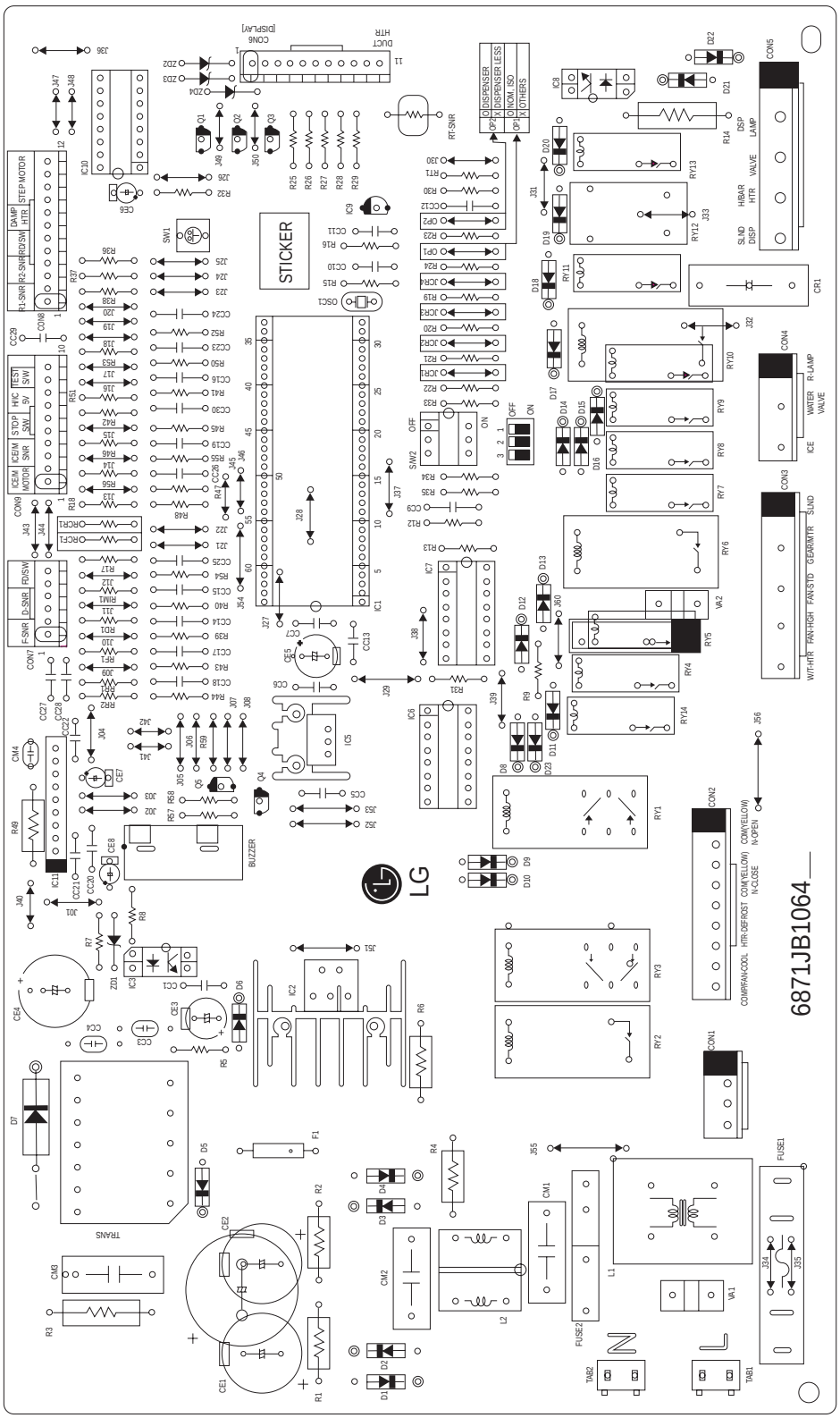
- Tolerance of sensor resistance is ±5 %.
- Leave the sensor at measuring temperature for more than 3 minutes when measuring sensor resistance. (necessary due to detecting speed)
- It is desirable to use digital tester as analogue tester has wider measuring temperature.
- Disassemble refrigerator sensor 1 and 2 from CON8 of main PWB assembly and measure it with digital tester.
- Disassemble freezer sensor from CON7 of main PWB assembly and measure it with digital tester.

MICOM CIRCUIT DESCRIPTION

3. PWB Parts Drawings and List

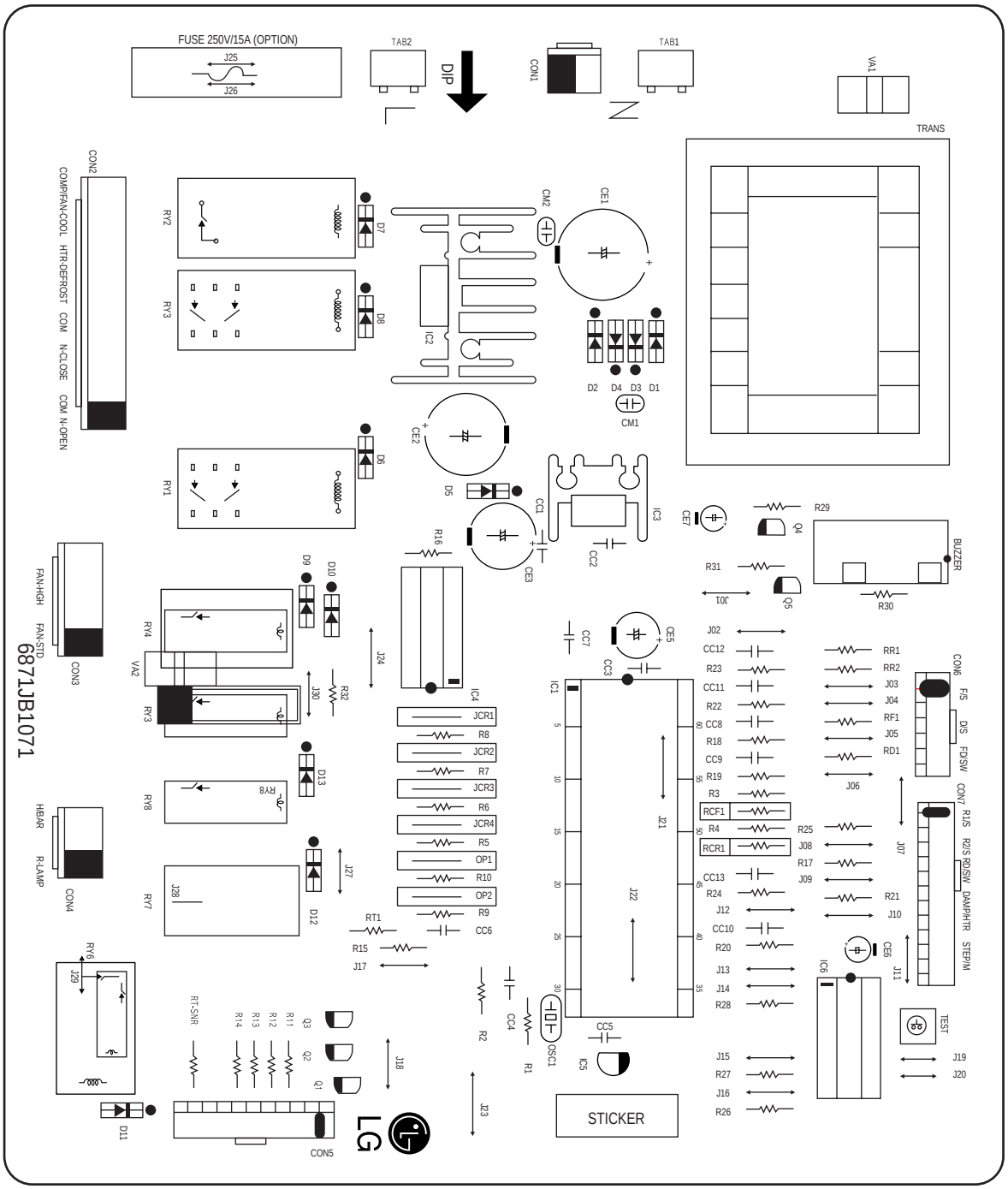
3-1. PWB Assembly Main Parts Drawings

1 GR-P247, GR-P207, GR-L247, GR-L207



MICOM CIRCUIT DESCRIPTION

2 GR-C247, GR-C207, GR-B247, GR-B207



MICOM CIRCUIT DESCRIPTION

3-2. Parts List

1. GR-P247, GR-P207 / GR-L247, GR-L207

GR-L247/207 QTY.	GR-P247/207 QTY.	WORK NO.	DWG. NO.	DESCRIPTION	SPEC'	MAKER	REMARK
1	1	1	6870JB2032A	PWB,MAIN	FR-1(DS-1107A)	DOO SAN	t=1.6
1A	1A	2	6170JB2007	TRANS,SMPS(COIL)	1.2±2mH/7.3-10.1Ω/4.5-6.6Ω	UNION	TRANS
1	1	3	6630JB8001G	WAFER	JE202-1T-04	JAE EUN	CON1
1	1	4	6630JB8001Y		JE202-1T-09		CON2
1	1	5	6630JB8001B		JE202-1T-03(SP-2,4)		CON4
		6					
1	1	7	6630JB8001D		JE202-1T-05(SP-2,4,6,8)		CON3(RED)
		8					
1	1	9	6630JB8001D		JE202-1T-05(SP-2,4,6,8)		CON5
		10				YEON HO	
1	1	11	6630JB8004E		SMW250-06		CON7
1	1	12	6630JB8004J		SMW250-10		CON9
1	1	13	6630JB8004L		SMW250-12		CON8
1	1	14	6630JB8004K		SMW250-11		CON6
1		15	0IZZJB2003C	MICOM CHIP	TMP87C841N	TOSHIBA	IC1(=0IZZJB 2003D)
	1		0IZZJB2003E		TMP87C841N		IC1(=0IZZJB 2003F)
		16	0INE780050A	REGULATOR	KIA78005AP	K.E.C	IC5
1	1		0IRH178050B		BA17805T	ROHM	
1	1	17	0IKD010100A	RESET IC	BMR0101D	KODENSHI	IC9
2	2	18	0IKE650030B	DRIVE IC	KID65003AP	K.E.C	IC6,7
1	1	19	0IT0777400A	DRIVE IC	TA7774AP	TOSHIBA (JAPAN)	IC10
1	1	20	0IRH622200A	DRIVE IC	BA6222	ROHM	IC11
1	1	21	0ISK615300A	DRIVE IC	STR-G6153T	SANKEN	IC2
		22					
1	1	23	0IT0721000A	PHOTO TR	TLP721	TOSHIBA	IC3
1	1						IC8
		24	J510-00005A	RELAY	G2R-1A-E	OMRON	
1	1	25	6920JB2005A		JW1aFHN	NAIS	RY6
			6920JB2002A		VS-12MB	TAKAMISAWA	
1	1	26	6920JB2005A		JW1aFHN	NAIS	RY2
			6920JB2004A		DH12DI-0-Q	JAEIL	
2	2	27	6920JB2007A		VSB-12TB	TAKAMISAWA	RY1,3
1	1	28	6920JB2003A		G5N-1A	OMRON	RY5
6	6	29	6920JB2003A		G5N-1A	OMRON	RY4,7,8,9 RY11,13
1	1						RY14
1	1	30	6920JB2003A		G5N-1A	OMRON	RY10 (R-LAMP)
		31	6920JB2004A		DH12DI-0-Q	JAEIL	
	1	32	6920JB2006B		UT205-12SC	YUYU	RY12(H/BAR)
1	1	33	6212AQ9002B	RESONATOR	CST4.00MGW	MURATA	OSC1 (=6212AQ9002B)
			J570-00012B		CST4.00MGW-TF01		
1	1	34	6102JB8001B	VARISTOR	INR14D621	IL JIN	VA1
		35	J572-00001D		INR14D271	IL JIN	
		36	6102AQ9075E		INR10D471	IL JIN	VA2
1	1	37	0DR107009AA	FAST RECOVER D	FR107	DELTA	D5
1	1	38	0DR302000BA		FR302		D7
		39					
5	5	40	0DD400409AC	RECTIFIER DIODE	1N4004	DELTA	D8~10,13,17
5	5	41	0DD400709AB		1N4007		D1~4,22
1	1	42					D12
8	8	43	0DD414809BB	SWITCHING DIODE	1N4148	ROHM	D6,11,14,15 16,18,20,21
	1						D19(H/BAR)
							D17(R/LAMP)
1	1						D23
1	1	44	0DZ152419AA	ZENER DIODE	1N5241B/11V	DELTA	ZD1

GR-L247/207 QTY.	GR-P247/207 QTY.	WORK NO.	DWG. NO.	DESCRIPTION	SPEC'		REMARK
1	1	45	0CE2271F638	ELE' CAPACITOR	220uF/16V	SAM HWA RUBYCON	CE5
1	1	46	0CE687AH690		680uF/25V RX TYPE		CE4
1	1	47	0CE1071H638		100uF/25V		CE7
1	1	48	0CE4761H638		47uF/25V		CE8
1	1	49	0CE1061K638		1uF/50V		CE6
1	1	50	0CE4761K638		47uF/50V		CE3
		51	0CE686AR630		68uF/250V RX TYPE		CE1,CE2
1	1	52	0CE476AK638		47uF/450V HE TYPE		CE2
1	1	53	0CQ4732Y430	MYL' CAPACITOR	473/630V		CM3
1	1	54	0CQ2231N409		223/100V	SEIL	CM4
1	1	55	0CK1020K519	CER' CAPACITOR	102/50V	TAE YANG	CC12
6	6	56	0CK1040K919		104/50V		CC5~7,9~11
18	18						CC13~30
1	1	57	0CK4710K519		471/50V		CC1
		58					
		59					
		60					
		61					
1	1	62	0CQ10418670		104/275V	PILKOR	CM2
1	1	63	0CQ10418670		104/275V		CM1
2	2	64	0CK22102510		221 /2KV	SAM HWA	CC3,4
		65	0RS2701K600	R,OXIDE FILM	2.7K /2W	(1)CHOYANG (2)SMART	
		66	0RS4702K600		47K/2W		
2	2	67	0RS5602K600		56K /2W		R3,14
		68	0RS0151J609		1.5 /1W		
		69	0RS8202J609		82K /1W		R4
1	1	70	0RS1503J609		150K /1W		R4
1	1	71	0RD0221H609	R,CARBON FILM	2.2 1/2W		R6
1	1	72	0RD0682H609		68J 1/2W		R49
		73	0RD2003H609		200K 1/2W		R1
		74	0RD2003H609		200K 1/2W		R2
1	1	75	0RD5603H609		560K 1/2W		R2
1	1	76	0RD0222G609		22 1/4W		R5
1	1	77	0RD1000G609		100 1/4W		R13
5	5	78	0RD1800G609		180J 1/4W		R25~R29
1	1	79	0RD2200G609		220 1/4W		R57
		80	0RD6200G609		620 1/4W		R9
1	1	81	0RD1001G609		1K 1/4W		R58
1	1	82	0RD1201G609		1.2K 1/4W		R8
1	1	83	0RD1801G609		1.8K 1/4W		R7
9	9	84	0RD2001G609		2K 1/4W		R31,39~46
6	6						R50,52~56
11	11	85	0RD4701G609		4.7K 1/4W		R16,19~24,32~35
4	4						R47,48,51,59
3	3	86	0RD1002G609		10K 1/4W		R12,17,18
4	4						R30,36~38
1	1	87	0RD1004G609		1M 1/4W		R15
1	1	88	0RD1002G609		10K 1/4W		RCF1
1	1	89	0RD1002G609		10K 1/4W		RCR1
		90	0RD0101J609		1 /1 W		R6
		91					
		92					
		93					
		94					
		95					
1	1	96	0RN1002G409	R,METAL FILM	10KF 1/4W		RT1
2	2	97	0RN1622G409		16.2KF 1/4W		RF1,RIM1
3	3	98	0RN2612G409		26.1KF 1/4W		RD1,RR1,2

MICOM CIRCUIT DESCRIPTION

1. GR-P247, GR-P207, GR-L247, GR-L207

GR-L247/207 QTY.	GR-P247/207 QTY.	WORK NO.	DWG. NO.	DESCRIPTION	SPEC'		REMARK
1	1	99	0TR106009AC	TRANSISTOR	KTA106M	K.E.C	Q4
1	1	100	0TR106009AF		KTC106M		Q5
1	1	101	6908JB3002A	BUZZER,PIGZO CE	BM-20K	BUJEON	BUZZER
1	1	102	6210JB8001A	CORE(CIRE),BEADS	BFS3510A0	SAM HWA	F1
1	1	103	6600JB8001A	TEST S/W	SKHV10910	LG	SW1
1	1	104	6600JB8003A	DIP S/W	3P,DIP	OTAX	SW2
10	10	105	43607015	JUMP WIRE	0.6X7.5mm		J40~49
34	34				0.6X10mm		J01~31,36~37,60
							J32(R-LAMP)
							J33(H/BAR)
							J34,35(FUSE1)
1	1						FUSE2
1	1						JCR1
1	1						JCR2
1	1						JCR3
1	1						JCR4
							OP1
1	1						OP2
1	1						R9
7	7				0.6X12.5mm		J50~56
1	1						R1
1	1	106	6200JB8001A	RC FILTER	0.1uF+120/250VAC	PILKO	CR1
1	1	107	4920JB3007A	HEAT SINK(STR)			
1	1	108	4920JB3001A	HEAT SINK(5V)	(=J572-00002A)		
1	1	109	6200JB3004A	COMMON COIL	2mH	TNC	L1
		110					L1
1	1	111	6200JB3005A		32mH	UNION	L2
		112					L2
		113					
1	1	114	3J02447C	FUSE	15A/250V	SAM JU	FUSE1
2	2	115	6901JB8001A	FUSE HOLDER	FC61F		
		116	0FZZJB3001A	FUSE	2A/250V		FUSE2
		117					
2	2	118	0Q01030F	250 TAB	GP881191-2	K.E.T	TAB1,2
2	2	119	1SBF0302418	SCREW	ASSY H/SINK	TAE SUNG	
3.0g	3.0g	120	49111001	SOLDER	ALMIT KR-19RMA	DAE JIN	
25g	25g	121	49111004	SOLDER LEAD BAR	H63A		
1.5g	1.5g	122	59333105	FLUX AUTO	JS71	KOKI	
3	3	123	0TR226009AB	TRANSISTOR	KRA226M	K.E.C	Q1~Q3
1	1	124	6500JB3001A	SENSOR	PBN-43	JAMES TEC	RT-SNR
3	3	125	0DZ152349AA	ZENER DIODE	1N5234B	DELTA	ZD2~ZD4
2	2	126	43607015	JUMP WIRE	0.6*10mm		J38,39

MICOM CIRCUIT DESCRIPTION

2. GR-C247, GR-C207, GR-B247, GR-B207

NO.	DWG. NO.	DESCRIPTION	SPEC'		MAKER	REMARK
1	6870JB2031A	PWB,MAIN	FR-1(DS-1107A)	1	DOO SAN	t=1.6
2	6170JB2002H	TRANS	t220V,50Hz 0:15V,320mA	1	TAE SUNG	TRANS
3	6630JB8001X	WAFER	JE202-1T-02	1	JAE EUN	CON1
4	6630JB8001A		JE202-1T-02(3P-2)	1		CON4
5	6630JB8001B		JE202-1T-03(5P-2,4)	1		CON3
6	6630JB8001Q		JE202-1T-11	1		CON2
7						
8	6630JB8004E		SMW250-06	1	YEON HO	CON6
9	6630JB8004J		SMW250-10	1		CON5
10	6630JB8004L		SMW250-12	1		CON7
11						
12	0IZZJB2003C	MICOM CHIP	TMP87C841N	1	TOSHIBA	IC1(=0IZZJB2003D)
13	0IRH178050B	REGULATOR	BA17805T	1	ROHM	IC3
	0IKE780050A		KIA78005AP		K.E.C	
14	0IKD010100A	RESET IC	BMR0101D	1	KODENSHI	IC5
15	0IKE650030B	DRIVE IC	KID65003AP	1	K.E.C	IC4
16	0IT0627830A	DRIVE IC	TD62783AP		TOSHIBA (JAPAN)	
	0IMI545630A		M54563P		MITSUBISHI	
17	0IKE650830A	DRIVE IC	KID65083AP		K.E.C	
	0IT062083A		TD62083AP		TOSHIBA	
18	0IT0777400A		TA7774AP	1	TOSHIBA (JAPAN)	IC6
19	0IRH178120A	REGULATOR	BA17812T	1	ROHM	IC2
	0IKE781200M		KIA7812PI(NEW)		K.E.C	
20	6920JB2007A	RELAY	VSB-12TB		TAKAMISAWA	
21						
22	6920JB2005A		JW1aFHN	2	NAIS	RY2,RY3
	6920JB2002A		VS-12MB		TAKAMISAWA	
	6920JB2004A		DH12DI-0-Q		JAEIL	RY2
23	6920JB2003A		G5N-1A	2	OMRON	RY4,5
			G5N-1A	1	OMRON	RY6
24	6920JB2006B		UT205-12SC	1	YUYU	RY7
25	J570-00012A	RESONATOR	CST4.00MGW	1	MURATA	OSC1 (=6212AQ9002B)
	J570-00012B		CST4.00MGW-TF01			
26	J572-00001C	VARISTOR	SVC471D14A		SAMHWA	VA1
	(=6102AQ9075A)		INR14D471		IL JIN	
27	6102JB8001A		SVC621D14A	1	SAMHWA	
	6102JB8001B		INR14D621		IL JIN	
28	J572-00001D		SVC271D14A		SAMHWA	
			INR14D271		IL JIN	
29						
30	0DD400409AC	RECTIFIER DIODE	1N4004	8	DELTA	D1~5,D7,8
31	0DD400709AB		1N4007			
32	0DD414809BB	SWITCHING DIODE	1N4148	2	ROHM	D9,D10
				2		D11,12
						D13
33						

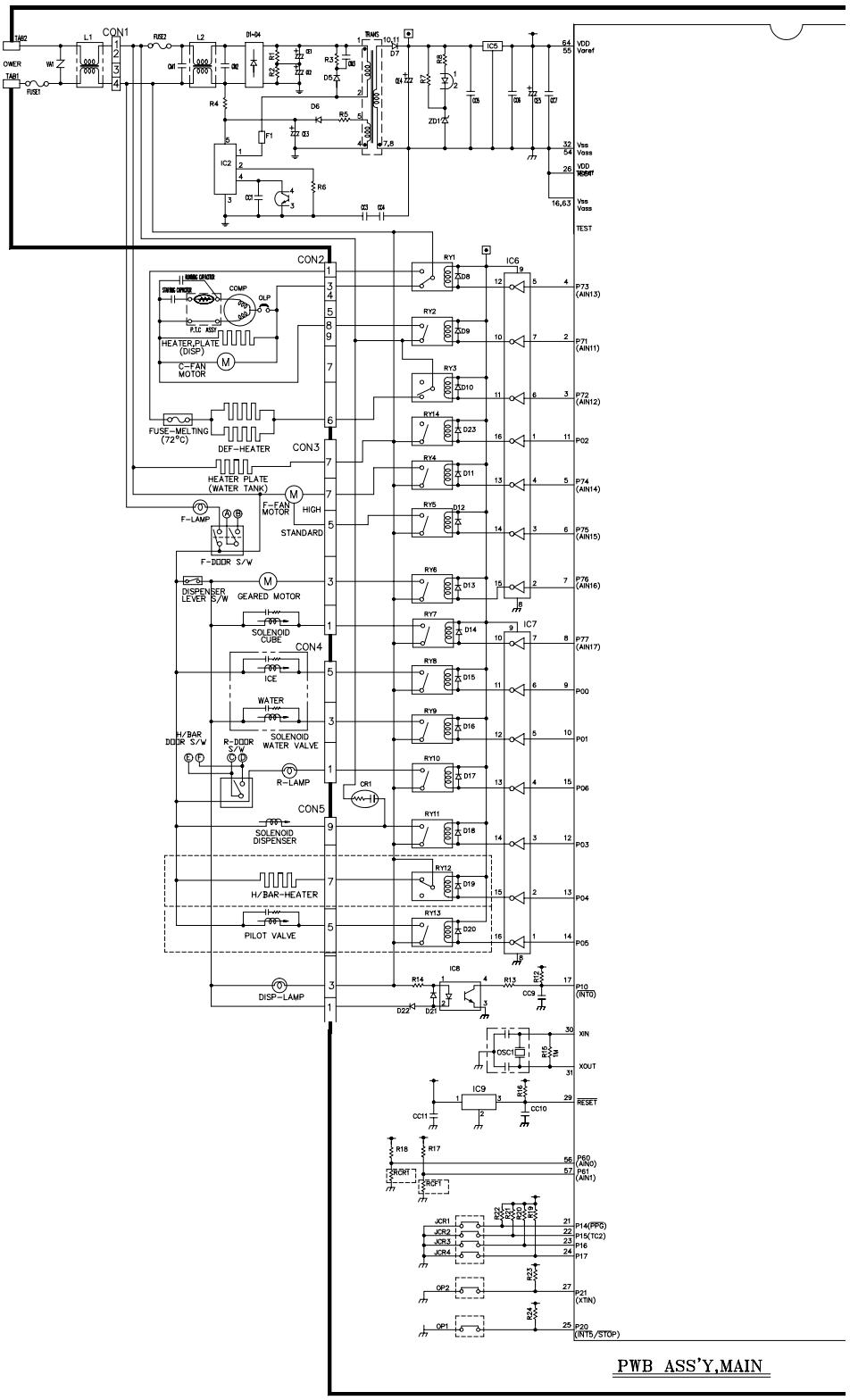
NO.	DWG. NO.	DESCRIPTION	SPEC'		MAKER	REMARK
34	0CE2286J618	ELE' CAPACITOR	2200uF/35V	1	SAM HWA RUBYCON	CE1
35	0CE1081H618		1000uF/25V	1		CE2
36	0CE4771H618		470uF/25V	1		CE3
37	0CE2271F638		220uF/16V	1		CE5
38	0CE4761H638		47uF/25V	1		CE7
39	0CE1051K638		1uF/50V	1		CE6
40						
41	0CQ2231N409	MYL' CAPACITOR	223/100V	2	SAM HWA	CM1,2
42	0CK1020K519		102/50V	1		CC6
43	0CK2230K949	CER' CAPACITOR	223/50V	7	TAE YANG	CC7~CC13
44	0CK1040K919		104/50V	5		CC1~CC5
45	ORD1803G609	R,CARBON FILM	180K 1/4W		SMART	RCF1
	ORD5602G609		56K 1/4W			
	ORD3302G609		33K 1/4W			
	ORD1802G609		18K 1/4W			
	ORD1202G609		12K 1/4W			
	ORD1002G609		10K 1/4W	1		
	ORD8201G609		8.2K 1/4W			
	ORD5601G609		5.6K 1/4W			
	ORD3301G609		3.3K 1/4W			
	ORD2001G609		2K 1/4W			
	ORD4700G609		470 1/4W			
46	ORD1803G609		180K 1/4W			RCR1
	ORD5602G609		56K 1/4W			
	ORD3302G609		33K 1/4W			
	ORD1802G609		18K 1/4W			
	ORD1202G609		12K 1/4W			
	ORD1002G609		10K 1/4W	1		
	ORD8201G609		8.2K 1/4W			
	ORD5601G609		5.6K 1/4W			
	ORD3301G609		3.3K 1/4W			
	ORD2001G609		2K 1/4W			
	ORD4700G609		470 1/4W			
47						
48						
49						
50	ORM1202N661	R,CEMENT	12K/5W			
51	ORS2701K600	R,OXIDE FILM	2.7K /2W			
52						
53	ORD2200H609	R,CARBON FILM	220J 1/2W			
54	ORD3600H609		360J 1/2W			
					SMART	
55	ORD1800G609		180 1/4W	4		R11~14
56						
58	ORD2200G609		220 1/4W	1		R29
59	ORD1001G609		1K 1/4W	1		R30
60	ORD2001G609		2K 1/4W	9		R16,R18~25
61						
62						
63						
64	ORD4701G609		4.7K 1/4W	9		R2,R5~10,17,31
65						
66						
67	ORD1002G609		10K 1/4W	6		R3,4,15,26~28
68	ORD1004G609		1M 1/4W	1		R1
69						
70	ORN1622G409	R,METAL FILM	16.2KF 1/4W	1		RF1
71	ORN2612G409		26.1KF 1/4W	3		RD1,RR1,2
72	ORN1002G409		10KF 1/4W	1		RT1

NO.	DWG. NO.	DESCRIPTION	SPEC'		MAKER	REMARK
73	0TR106009AC	TRANSISTOR	KTA106M	4	K.E.C	Q1~Q4
74	0TR106009AF		KTC106M	1		Q5
75	6908JB3002A	BUZZER,PIGZO CE	BM-20K	1	BUJEON	BUZZER
76	6806JB8001A	250 TAB	881206-2	2	KET	TAB1,2
77	6600JB8001A	TEST S/W	SKHV10910	1	LG	S/W1
78	6901JB8001A	FUSE HOLDER	FC61F	2		
79	3J02447C	FUSE	15A/250V	1	SAM JU	FUSE
80	43607015	JUMP WIRE	0.6X7.5mm	2		J19,20
						J29(R-LAMP)
81			0.6X10mm	18		J01~J18
						J25,J26
						J28(H/BAR)
						OP1
						OP2
				1		JCR1
				1		JCR2
				1		JCR3
				1		JCR4
82			0.6X12.5mm	4		J21~24
83						
84						
85	4920JB3001A	HEAT SINK(5V)	(=J572-00002A)	1		(IC2)
86	4920JB3003A	HEAT SINK(12V)	(=J572-00004A)	1		(IC13)
87	1SBF0302418	SCREW	H/SINK와 조립	2		
88	49111001	SOLDER	ALMIT KR-19RMA	3.0g		
89	49111004	SOLDER LEAD BAR	H63A	25g		
90	59333105	FLUX AUTO	JS71	1.5g	KOKI	

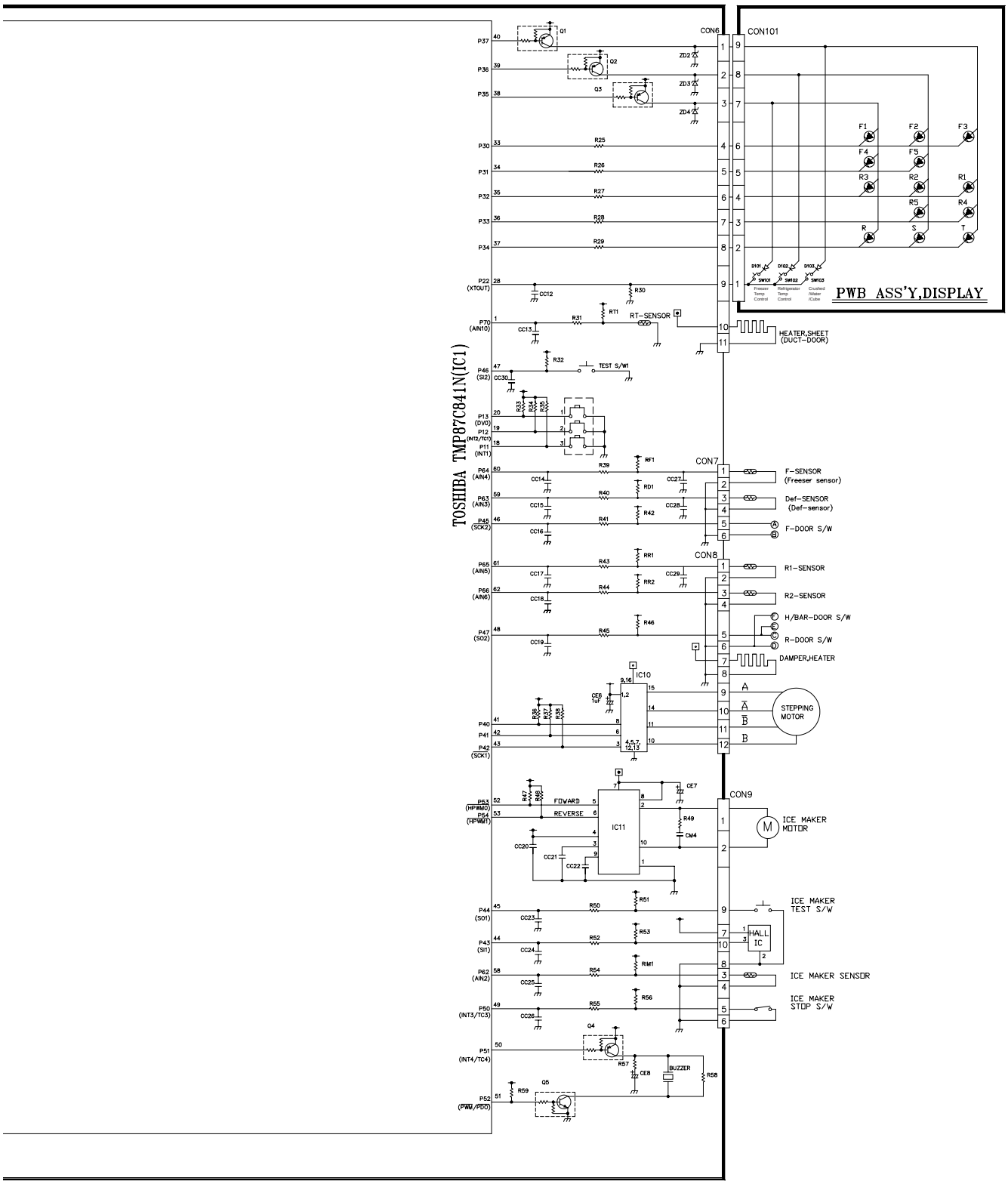
MICOM CIRCUIT DESCRIPTION

4. PWB circuit drawing- PWB circuit drawing may change depending on the conditions.

1 GR-P247, GR-P207,
GR-L247, GR-L207

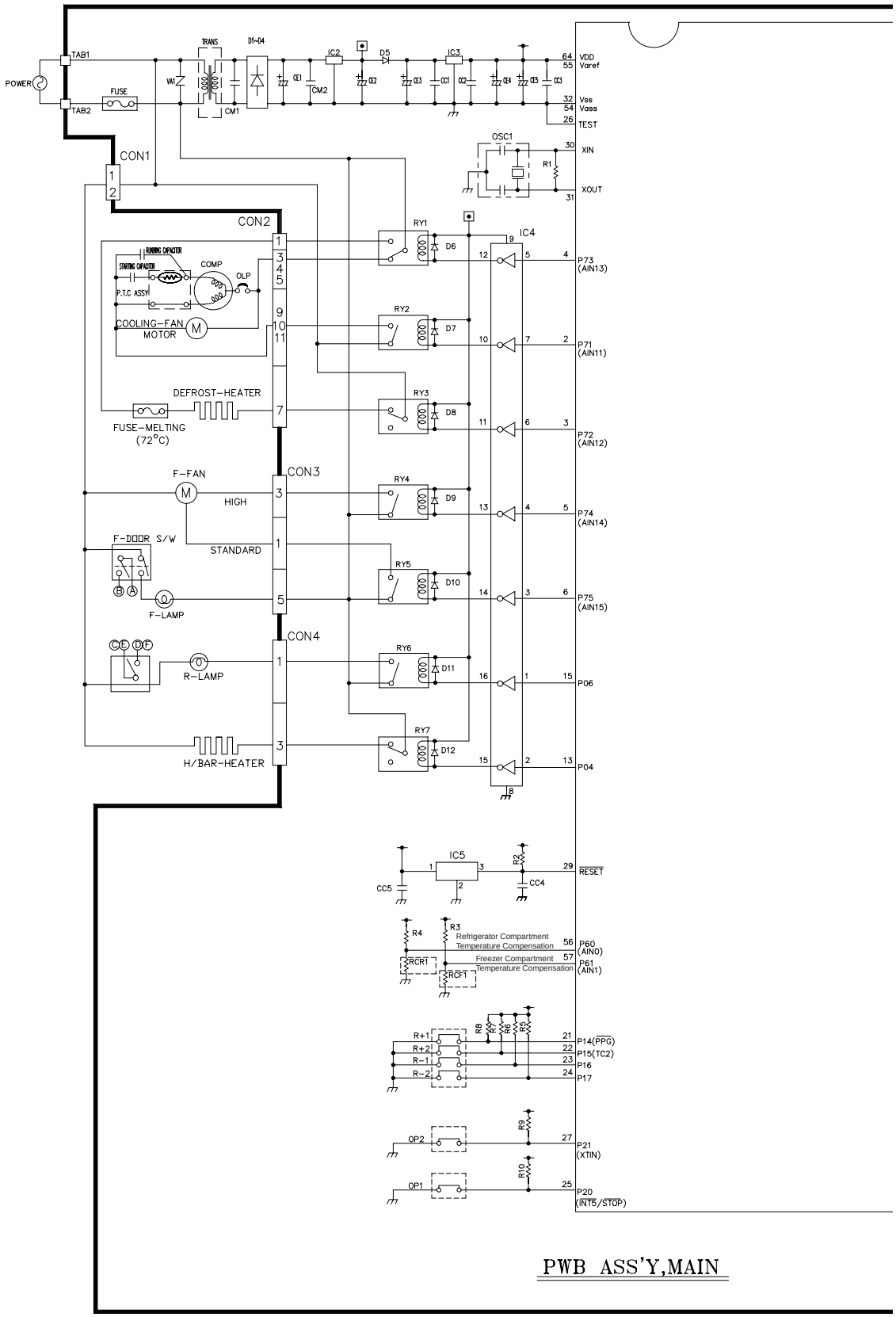


MICOM CIRCUIT DESCRIPTION

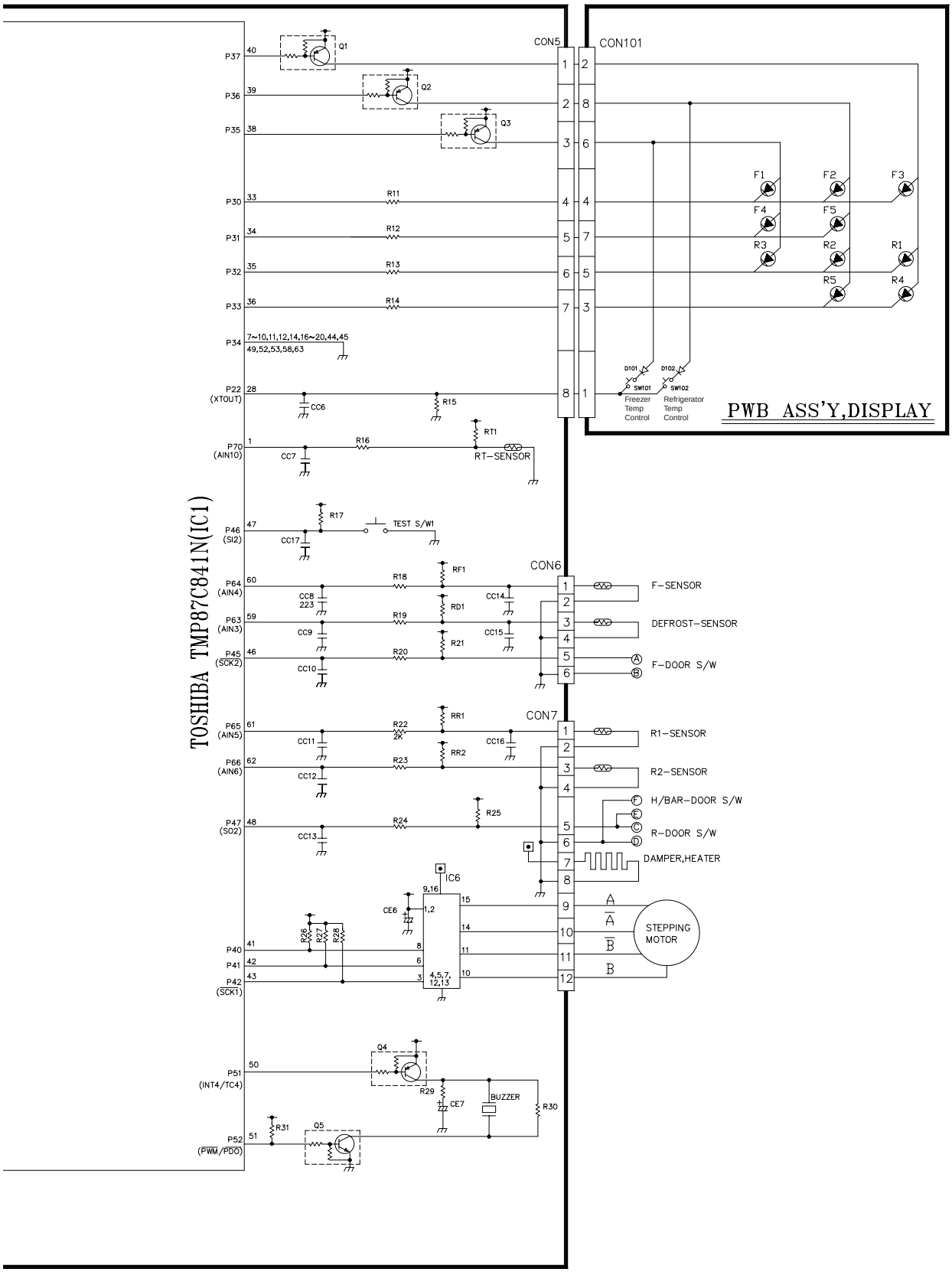


MICOM CIRCUIT DESCRIPTION

2. GR-C247, GR-C207, GR-B247, GR-B207



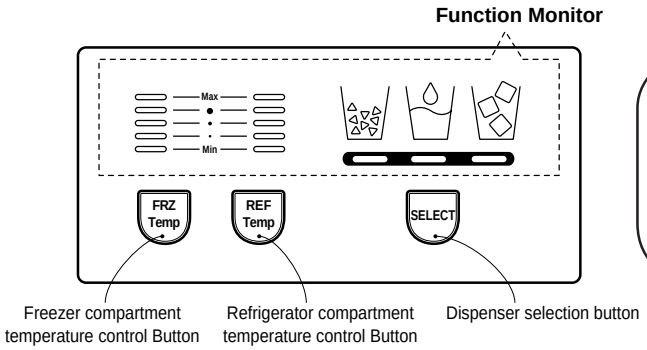
MICOM CIRCUIT DESCRIPTION



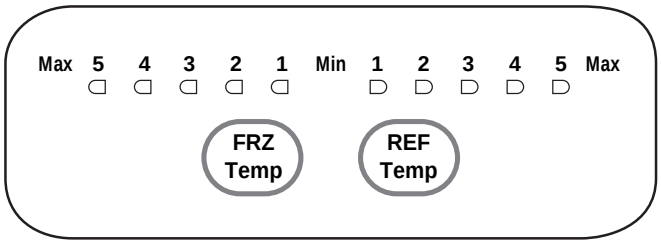
MICOM FUNCTION

1. Monitor Panel

1-1. GR-P247, GR-P207, GR-L247, GR-L207

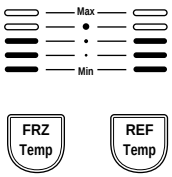
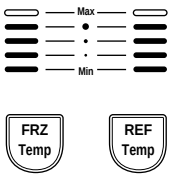
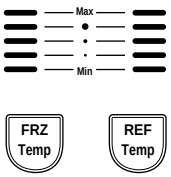
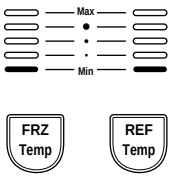
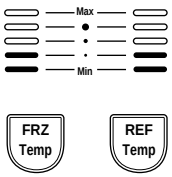


1-2. GR-C247, GR-C207, GR-B247, GR-B207



2. Description of Function

2-1. Funnction of Temperature Selection

Division	Power Initially On	1st Press	2nd Press	3th Press	4th Press
Change of Indication Lamp					
Temperature Control	Medium	Medium Max	Max	Min	Medium Min
Freezer Control	-19 °C (-18 °C)	-22 °C (-20.5 °C)	-23 °C (-22 °C)	-15 °C	-17 °C
Refrigeration Control	3 °C	1.5 °C	0°C	6 °C (7 °C)	4.5 °C

* The temperature can vary ±3 °C depending on the load condition. *( ) : 127V/60Hz, 110~115V/60Hz, 115V/60Hz Rating ONLY.

1. When power is initially applied or reapplied after power cut, “Medium” is automatically selected.
2. When the temperature selection switch in the freezer and refrigerator compartments is pressed, the light is on in the following sequence:
   "Medium" → "Medium Max" → "Max" → "Min" → "Medium Min" → "Medium"
3. The temperature setting condition of freezer and refrigerator compartments shall not be indicate in the standard model (GR-P247, GR-P207, GR-L247, GR-L207, GR-C247, GR-C207, GR-B247, GR-B207) when refrigerator or home bar door is closed.

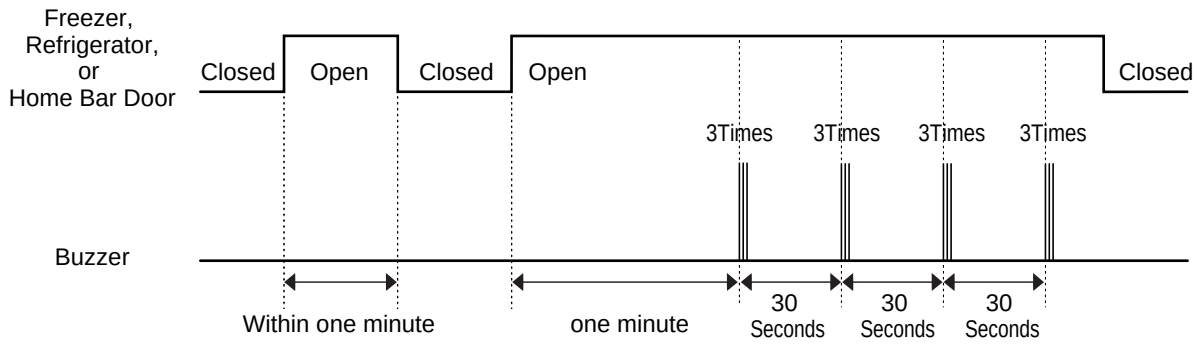
MICOM FUNCTION

2-2. Control of Variable Speed Fan in the Refrigerator Compartment

1. Fan motor in the freezer compartment shall change from standard to high speed rpm in order to increase cooling speed and load corresponding speed.
2. High speed rpm is only used for the initial power application and load corresponding operation. But standard rpm is used in the general working conditions.
3. Fan motor in the freezer compartment operates normally when freezer, refrigerator, or home bar door opens and fan motor in the freezer compartment operates (the speed changes from high to standard rpm if fan motor operates at high speed rpm). But fan motor in the freezer compartment stops when refrigerator or home bar door is open and refrigerator compartment door is closed.

2-3. Door Opening Alarm

1. Buzzer warns when freezer, refrigerator, or home bar door is kept open for more than 1 minute.
2. Buzzer warns 3 times at 0.5 second interval and then 3 times at 0.5 second on and off in every 30 seconds if door is kept open for more than 1 minute.
3. Warning is released when freezer, refrigerator, or home bar door is closed during door opening alarm.



2-4 Button Selection Buzzer Sound

1. “Bell” sounds when button on the front display is pressed.

2-5. Forced Start, Forced Defrost Buzzer Warning

1. When test button in the main PWB is pressed, “beep” sounds.
2. When forced start is selected, warning sounds three times for 0.2 second on and 1.8 seconds off.
3. When forced defrost is selected, warning sounds three times in the following cycle: 0.2 second on and 0.2 second off, 0.2 second on and 0.2 second off, and 0.2 second on and 1.0 second off.

2-6. Functions of Defrost

1. Defrost starts whenever the compressor operation time accumulates to seven to seven and a half hours.
2. Defrost starts whenever the compressor operation time accumulates to four to four and a half hours if power is initially applied (or reapplied after power cut).
3. Defrost completes when the temperature of defrost sensor reaches at 5 °C. Faulty defrost is indicated if the defrost sensor does not reach at 5 °C after 2 hours of defrosting.
4. Defrost does not work when defrost sensor is out of order (wire cut or short-circuit).

MICOM FUNCTION

2-7. Electric Equipment Sequential Operation

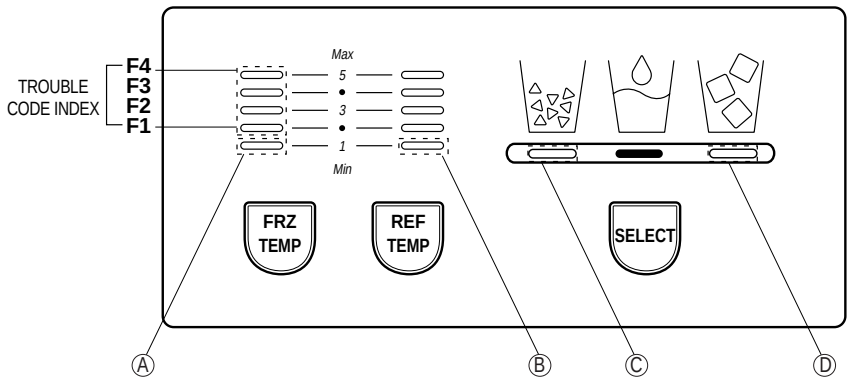
Electric equipment such as compressor, defrost heater, cooling fan, step motor damper, etc. operates in the following sequence when power is initially applied and test is completed in order to reduce noise and parts damage.

Function		Operation Sequence	Remarks
When power is initially applied	Defrost sensor temperature is above 10 °C (purchased or house-moving)	POWER ON → (0.5 sec.) COMP ON → (0.3 sec.) FAN 1400 (High Speed Operation) ON → (0.3 sec.) STEP MOTOR DAMPER ON → (0.3 sec.) HOME BAR HEATER ON	If there is any error in functions, initial starting does not work.
	Defrost sensor temperature is below 10 °C (power cut or service)	POWER ON → (0.5 sec.) DEFROST HEATER ON → (8 sec.) DEFROST HEATER OFF → (0.3 sec.) HOME BAR HEATER ON → (5 sec.) HOME BAR HEATER OFF → (0.3 sec.) WATER TANK HEATER ON → (5 sec.) WATER TANK HEATER OFF → (0.3 sec.) COMP ON → (27 sec.) FAN 1170 (Standard Operation) ON → (0.3 sec.) STEP MOTOR DAMPER ON	
TEST MODE	Test Mode 1 (Forced Start)	TEST S/W (Press Once) → OTHER LOADS OFF → (0.3 sec.) COMP ON → (0.3 sec.) FAN 1400 (High Speed Operation) ON → (0.3 sec.) STEP MOTOR DAMPER ON	If switch is pressed one more or defrost sensor temperature is above +5 °C, it returns to test mode and restarts. (compressor shall operate after 7 minutes)
	Test Mode 2 (Check Freezer fan)	TEST S/W (Press Twice) → COMP OFF → (0.3 sec.) FAN 1400 (High Speed Operation) OFF → (0.3 sec.) FAN 1170 (Standard Operation) ON → (0.3 sec.) STEP MOTOR DAMPER OPEN	
	Test Mode 3 (Forced defrost)	TEST S/W (Press Three Times) → FAN 1170 (Standard Operation) OFF → (0.3 sec.) DEFROST HEATER ON → (0.3 sec.) STEP MOTOR DAMPER CLOSE	

MICOM FUNCTION

2-8. Function of Trouble Diagnosis

1. Function of trouble diagnosis is to make the repair service easy when the refrigerator is out of order during service.
2. The function control button does not work but the recognition sound is heard when the refrigerator is out of order.
3. It returns to normal conditions when trouble code led is off. (reset)
4. Trouble code is indicated by the freezing temperature indicator led in the refrigerator display. All leds except trouble code are off.

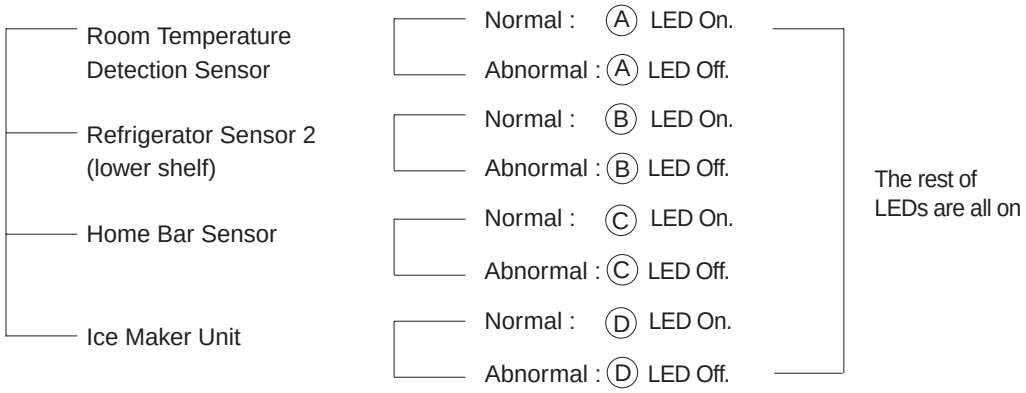


◐ : On ● : Off ● : Normal

No.	Trouble	Trouble Code Indicator				Troubles	Operation conditions during Trouble			
		F4	F3	F2	F1		Compressor	Freezer Fan	Defrost Heater	Step motor Damper
1	Abnormal Freezer sensor.	●	●	●	◐	Freezer sensor short	15 min. on/ 15 min. off	Standard RPM	●	●
2	Abnormal Refrigerator sensor 1 (R1) (Upper part in the refrigerator compartment)	●	●	◐	●	Refrigerator sensor 1 short circuit	●	Standard RPM	●	Note 2)
3	Abnormal Refrigerator sensor 2 (lower part in the refrigerator compartment)	Note 1)				Refrigerator sensor 2 short circuit	●	Standard RPM	●	●
4	Abnormal Defrost sensor	●	◐	●	●	Defrost sensor short circuit	●	Standard RPM	No defrosting	●
5	Failed defrosting	◐	◐	◐	◐	Defrost Heater, Temperature Fuse short circuit. Unplugged Connector (Indicated 4 hour later after trouble)	●	Standard RPM	●	●
6	Abnormal Open Air Temperature Detecting sensor	Note 1)				Open air temperature detecting sensor short circuit	●	●	●	
7	Abnormal ice making sensor	Note 1)				Defrost sensor short circuit.	●	●	●	●
8	Abnormal ice maker unit	Note 1)				Faulty Ice Maker Unit Motor or Hall IC, L/Wire short circuit. Faulty motor driving circuit.	●	Standard RPM	●	●

MICOM FUNCTION

Note 1) When open air temperature detecting sensor, refrigerator sensor 2, ice maker unit, ice making sensor are abnormal, it is not indicated in the trouble code. But it is indicated while checking LED (press freezer and refrigerator temperature control buttons for more than 1 second at the same time).


Room Temperature Detection Sensor
Refrigerator Sensor 2 (lower shelf)
Home Bar Sensor
Ice Maker Unit
Normal : Ⓐ LED On.
Abnormal : Ⓐ LED Off.
Normal : Ⓑ LED On.
Abnormal : Ⓑ LED Off.
Normal : Ⓒ LED On.
Abnormal : Ⓒ LED Off.
Normal : Ⓓ LED On.
Abnormal : Ⓓ LED Off.
The rest of LEDs are all on

Note 2) When refrigerator sensor is abnormal, it opens for 10 minutes and closes for 15 minutes.

2-9. Test Function

1. Test function is to check the function of PWB and products and to find defective parts when the refrigerator is out of order.
2. Test button is on the main PWB of the refrigerator. Test mode completes after 2 hours in maximum and returns to normal conditions.
3. Function control button does not work but button recognition sound is heard during the test mode.
4. When test mode is completed, unplug and replug the power cord to return to the normal conditions.
5. When sensor is abnormal in the test mode, test mode is released and trouble code is indicated.
6. Test mode does not work even test button is pressed when trouble code indicator is on.

Mode	Operation	Contents	Remarks
Test 1	Press test button once	1. Continuous compressor operation 2. Continuous freezer fan (high rpm) operation 3. Defrost heater off. 4. All display LEDs are on. 5. Electronic stepping motor damper open (baffle is open).	Forced start
Test 2	Press test button once in Test Mode 1	1. Compressor off. 2. Freezer fan (high rpm) off. 3. Freezer fan (standard rpm) on. 4. Defrost heater off. 5. “Medium Weak” led in freezer and refrigerator temperature indicators are on. 6. Step motor damper open condition (baffle is open)	Check fan in the freezer compartment
Test 3	Press test button once in Test Mode 2	1. Compressor is off. 2. Freezer fan off. 3. Defrost heater on. 4. “Medium” leds in freezer and refrigerator temperature indicators are on. 5. Step motor damper closed condition (baffle is open)	• Return to normal conditions when defrost sensor is above 5 °C. • Forced defrost.
Normal	Press test button onec in test mode 3	Return to initial conditions	Compressor starts after seven minutes.

MICOM FUNCTION

* LED check function- When freezer and refrigerator temperature control buttons are pressed for more than 1 second at the same time, all LEDS on the display are on. And it returns to the normal conditions when the buttons are released.
* Check of freezer fan rpm variation- Freezer fan speed changes from high speed to standard speed and vice versa for 30 seconds whenever freezer and refrigerator temperature control buttons are pressed at the same time for more than 1 second when freezer fan is in operation and returns to the previous rpm.

2-10. Functions of Ice Dispenser and Water Dispenser

1. Ice and cold water are available without opening refrigerator door.

2. The desired ice (crushed or cube) or cold water are dispensed when dispenser press button (rubber button) is pressed after selection of ice or cold water. When ice is selected, duct door opens by electric solenoid when dispenser press switch is pressed. When dispenser press switch is released, duct door closes after it opens for 5 seconds.

3. Ice and water dispensing function stops when freezer door is open.

4. Geared motor and solenoid are automatically off if there is no signal after 3 minutes when ice (crushed and cube) or water is selected and dispenser switch is pressed down. Solenoid (duct door) stops after 5 seconds when solenoid is off. (in order to protect short circuit from solenoid heat generation)

5. Dispenser Lamp On/Off Function. The dispenser lamp shall be on or off whenever dispenser button is pressed or released, respectively after selection of ice (crushed or cube) or water.

6. Water/Crushed Ice/Cube Ice Selection function
   1) It is to select water/crushed ice/cube ice by user from the function control part and it will be indicated and selected by pressing button.
   2) Crushed ice is automatically selected when power is initially on.
   3) When crushed ice is selected and its button is pressed, geared motor operates and crushed ice is dispensed.
   4) When cube ice is selected and its button is pressed, geared motor and ice solenoid operate and cube ice is dispensed.

7. Function of Water Dispenser
   1) When user selects water in the function control parts, it is indicated in the LED and water is selected.
   2) Water dispenser is a direct tap water connection type. The water solenoid valve on the right of machine room opens and water dispenses when user selects water and presses button.

MICOM CIRCUIT DESCRIPTION

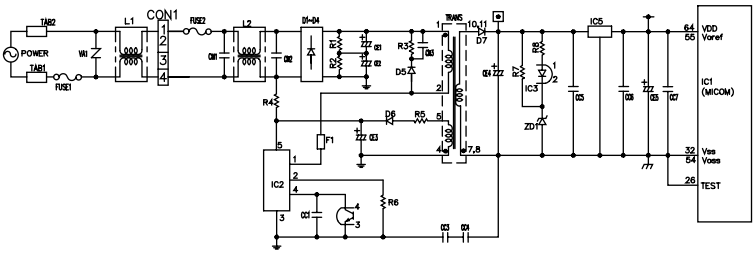
1. Description of PWB Circuit

1-1. Power Circuit

1. GR-P247, GR-P207, GR-L247, GR-L207

Power circuit is composed of switching mode power supply (SMPS) electric parts. SMPS is composed of rectifying part (D1~D4, CE1) which converts AC to DC voltage, switching part (IC2) which switches this converted DC voltage, trans which transmits primary energy to secondary energy, secondary power source which transmits power to MICOM and IC, and feed back part (IC3, ZD1) which feeds back voltage to primary trans in order to maintain constant secondary voltage.
The voltages at each part are as follows.

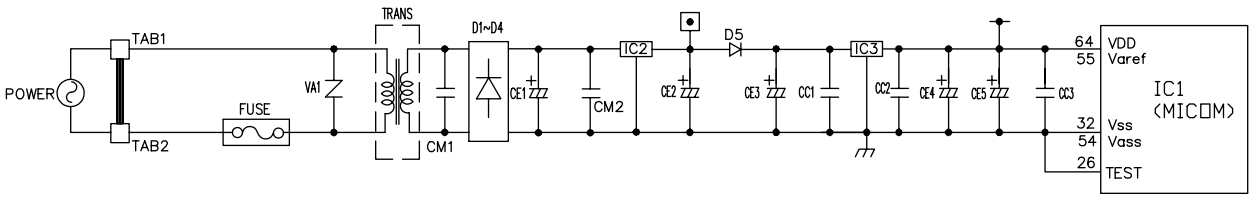
Note : If circuit is abnormal, repair it after 3 minutes when power cord is unplugged. Be care of electric shock as high voltage (DC 310 V) is applied to the circuit.



2. GR-C247, GR-C207, GR-B247, GR-B207

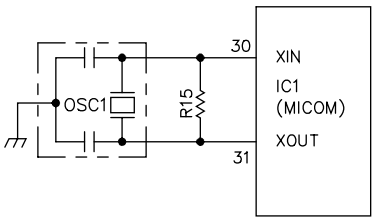
In the trans secondary side is composed of power source (12 Vdc) for driving relay and power source (5 Vdc) which supplies power to MICOM and IC. Voltages in each part are as follows.

Position	VA1	CM1	CM2	CE2	CE4
Voltage	220 Vac	14 Vac	17 Vac	12 Vdc	5 Vdc



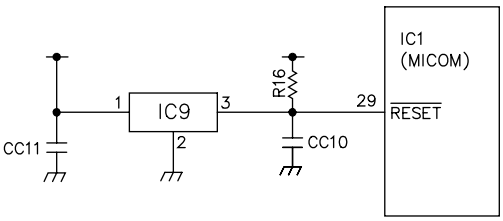
1-2. Oscillation Circuit

This is to generate basic time for synchronous clock and time calculation for internal logic element to send and receive information.Standard parts should be used as the time calculated by IC1 shall be changed or shall not work if OSC1 specification is changed.



1-3. Reset Circuit

Reset circuit is to initialize RAM in MICOM (IC1) and make all functions to start from the initial conditions when power is nitially applied or power is reapplied to MICOM after power cut. Low voltage is applied for 10 ms to the reset terminal of MICOM when power is applied. 5 voltage is applied to the reset terminal for general operation. (MICOM does not work when IC9(Reset IC) is failed)



MICOM CIRCUIT DESCRIPTION

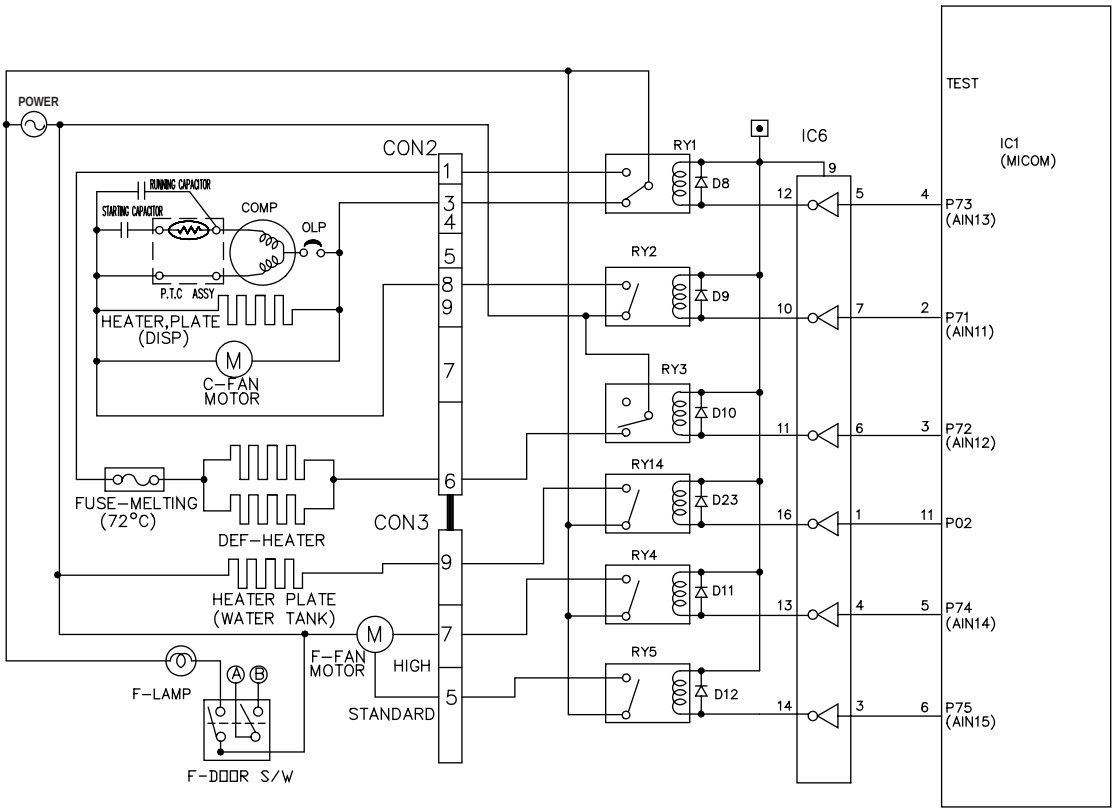
1-4. Load/Dispenser Operation, Buzzer Driving, Door Opening Detecting Circuit

1. LOAD DRIVING CIRCUIT

* Freezer fan motor shall stop when freezer or refrigerator door is open. Freezer fan motor shall immediately operate when freezer or refrigerator door is closed.
* Door switches A, B, C, D, E, F of freezer and refrigerator are connected to the door opening detecting circuit in Micom.
* Home bar door switch E, F is parallelly connected to the refrigerator door switch C, D. Therefore it can detect door opening when one of the door is open.

1) GR-P247, GR-P207, GR-L247, GR-L207

Load Types		Machine Room	Defrost Heater	AC Converting Relay	Heater, Plate (W/TANK)	Refrigerator Fan Motor	
						High Speed	Standard Speed
Measuring Locations(IC 6)		No.10	No.11	No.12	No.16	No.13	No.14
Condition	ON	Below 1 V					
	OFF	12 V					

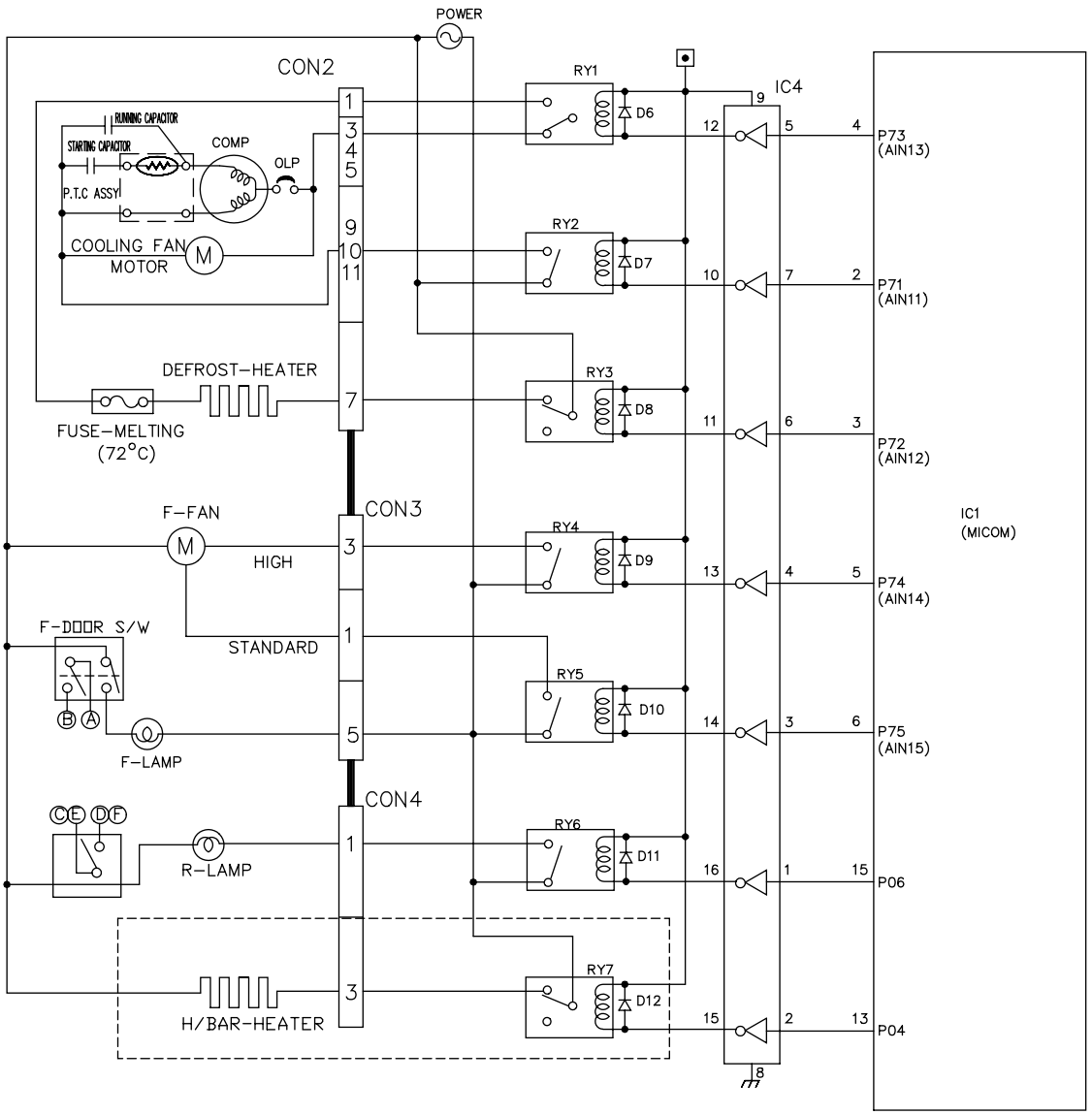


MICOM CIRCUIT DESCRIPTION

2) GR-C247, GR-C207, GR-B247, GR-B207

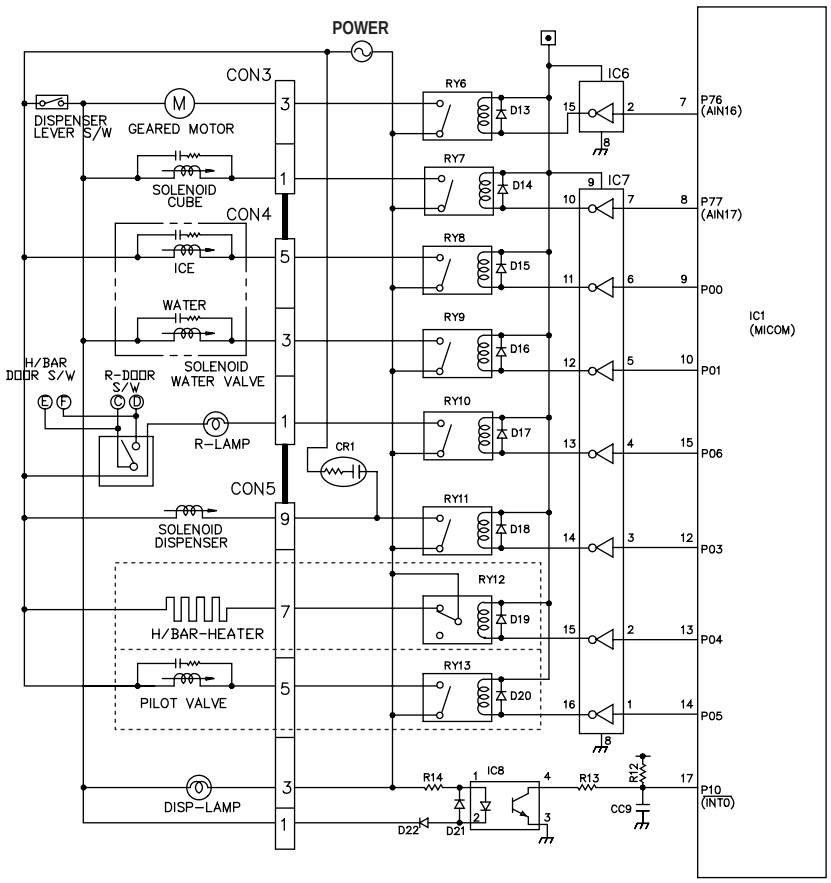
* Freezer fan motor shall operate when freezer, refrigerator, or home bar door is open.
* Door switches A, B, C, D of freezer and refrigerator are connected to door opening detecting circuit in Micom.
* Home bar door switch E, F is parallelly connected to the refrigerator switch C, D. Therefore it can detect door opening when one of the door is open.

Load Types		Machine Room	Defrost Heater	AC Converting Relay	Refrigerator Compartment Lamp	Home Bar Heater	Refrigerator Fan Motor	
							High Speed	Standard Speed
Measuring Points(IC 4)		No.10	No.11	No.12	No.16	No.15	No.13	No.14
Conditions	ON	Below 1 V						
	OFF	12 V						



MICOM CIRCUIT DESCRIPTION

2. Dispenser Operation Circuits
GR-P247, GR-P207, GR-L247, GR-L207



1) LOAD DRIVING CONDITION CHECK

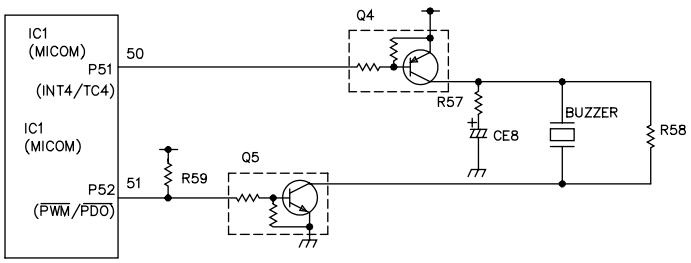
LOAD TYPE		GEARED MOTOR	SOLENOID CUBE	WATER VALVE			SOLENOID DISPENSER	HOME BAR HEATER	Refrigerator Compartment Lamp
				ICE	WATER	PILOT			
Measuring Points		No.15(IC6)	No.10(IC7)	No.11(IC7)	No.12(IC7)	No.16(IC7)	No.14(IC7)	No.15(IC7)	No.13(IC7)
Conditions	ON	Below 1V							
	OFF	12V							

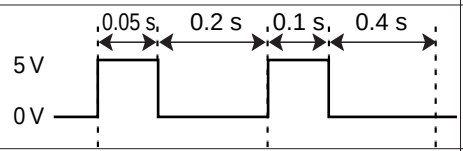
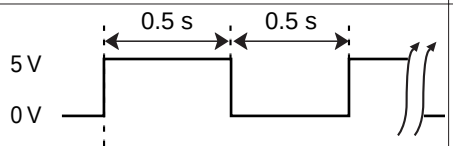
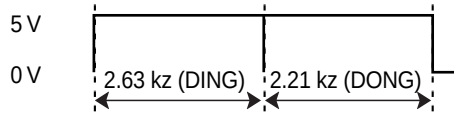
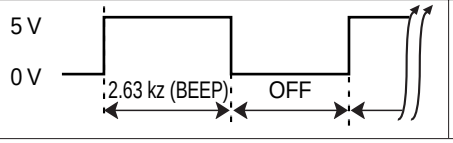
2) Lever Switch Detecting Circuit

Measuring Points / Lever S/W	IC1(Micom) No. 17
On(Press)	5V / 0V (60Hz)
OFF	5V

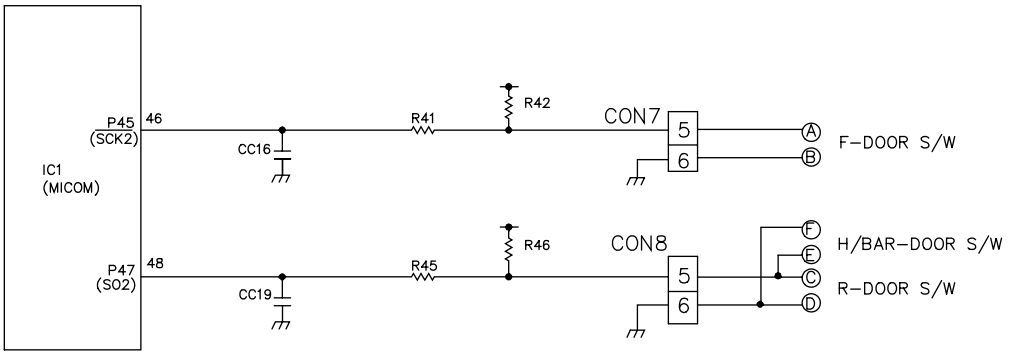
MICOM CIRCUIT DESCRIPTION

3. Buzzer Driving Circuits



CONDITIONS / MEASURING POINTS	Bell sounds when button on dosplay is pressed.	Beep sounds when warning door opening.	OFF
IC1 (No. 50 Pin)			0 V
IC1 (No.51 Pin)			0 V

4. Door Opening Detecting Circuits



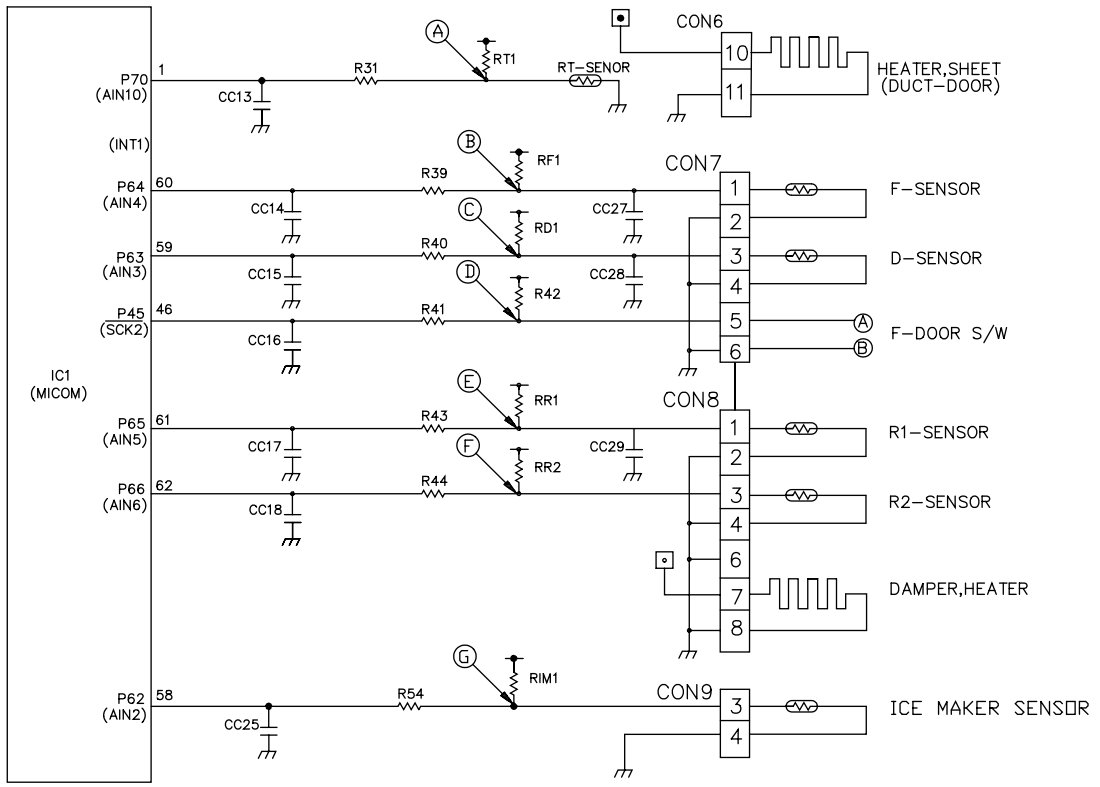
MEASURING POINTS / FREEZER / REFRIGERATOR DOOR	IC1 (MICOM) (Pin No. 46 and 48)
CLOSED	5 V (A - B, C - D, E - F both ends S/W off conditions)
OPEN	0 V (A - B, C - D, E - F both ends S/W on conditions)

* Door opening detecting switch (A - B) can not detect door opening when switch (A - B) or lead wire is failed even though freezer door switch is normal.

* Refrigerator lamp shall not be on when refrigerator door switch can not detect door opening detecting switch (C - D) or home bar door switch (E - F).

MICOM CIRCUIT DESCRIPTION

1-5. Temperature Detecting Circuit, Duct Door Heat Working Circuit



The above circuit is fixed in the freezer compartment sensor, refrigerator compartment sensor, ice making sensor, and defrost sensor. The condition of short or open of each temperature sensor is as follows.

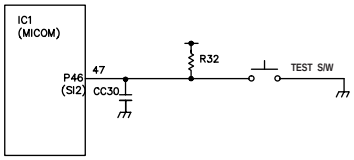
SENSOR	CHECK POINT	NORMAL(-30 °C ~ 50 °C)	SHORT	OPEN
OPEN AIR SENSOR	POINT Ⓐ Voltage	0.5 V~4.5 V	0 V	5 V
FREEZER SENSOR	POINT Ⓑ Voltage			
DEFROST SENSOR	POINT Ⓒ Voltage			
REFRIGERATOR SENSOR 1	POINT Ⓔ Voltage			
REFRIGERATOR SENSOR 2	POINT Ⓕ Voltage			
DEFROST SENSOR	POINT Ⓖ Voltage			

* 12 Vdc shall be applied to No. 10 and 11 terminals of CON6 as duct door heater is always on.

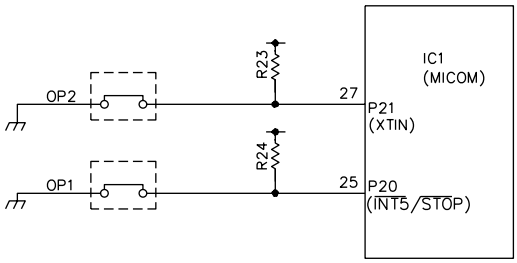
MICOM CIRCUIT DESCRIPTION

1-6. Switch Input Circuits

The following circuit is an input circuit to detect the test switch for refrigerator detection and to detect the signal of electronic single motor damper reed switch.



1-7. Option Designation Circuit (Model Classifying Function)

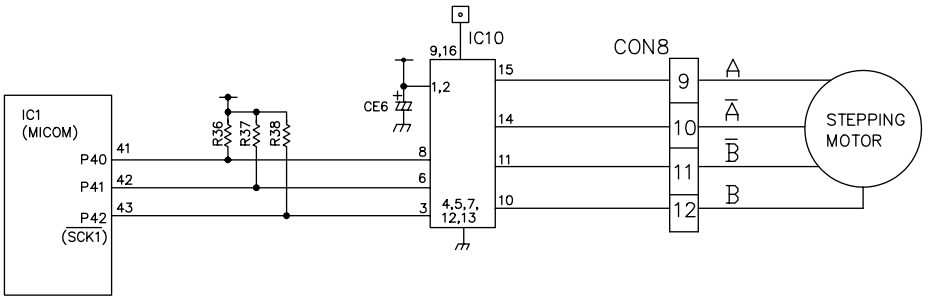


The above circuit is to designate model by option and inform it to MICOM. The option designation and application standard for each model is as follows.

Classification	Connection Conditions	Application Standard
OP1	Connection	Other area (Changable)
	Cut	Domestic
OP2	Connection	Model with dispenser
	Cut	Model without dispenser

▶ This circuit is fixed in the factory before shipment. Do not add or remove option at your discretion.

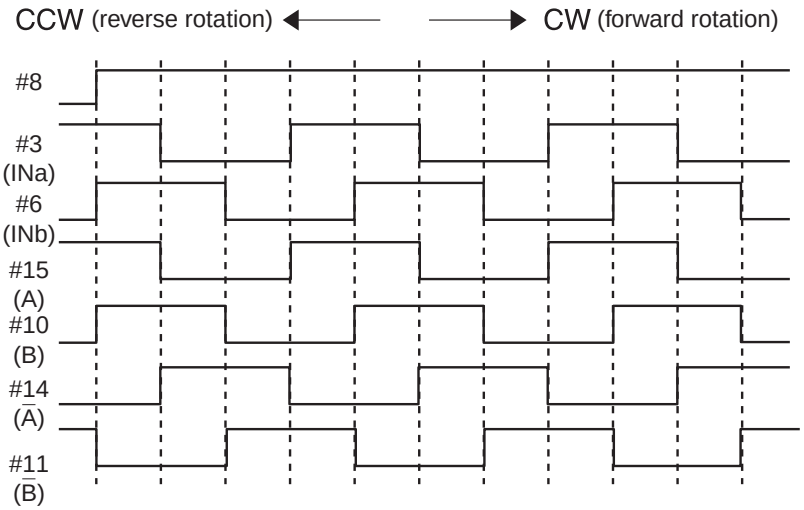
1-8. Stepping Motor Working Circuit



Motor rotates as rotating magnetic forms on the coils wound on each phase of stator when Micom pin No. 41 applies “High” signal to IC6 (TA774AP) and Micom pin No. 42 and 43 produces “High” and ‘Low” signals.

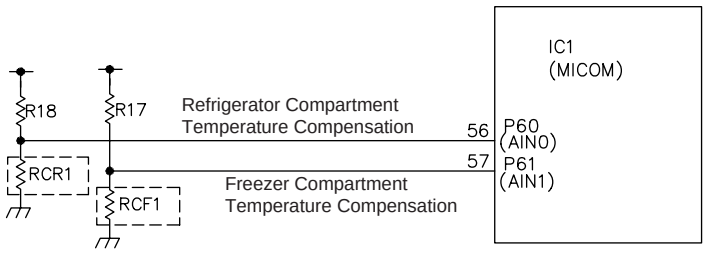
MICOM CIRCUIT DESCRIPTION

Description) MICOM Pin No. 41, 42, and 43 terminals send signals of which wave form are shown on the right in 3.33 msec cycles. These signals pass through input terminals (No. 3, 6, and 8) of motor driving IC6 (TA7774AP) and are sent to the output terminal (No. 10, 11, 14, 15). These output signals form rotating magnetic on the coils wound on each phase of stator and motor rotates. When signals are input to INa and INb of motor driving IC (TA774AP), rotating magnetic forms on the coils wound on each phase of stator and stepping motor damper rotates.



1-9. Temperature Compensation and Over Cooling/Weak Cooling Compensation Circuit

1. Freezer and refrigerator compartment temperature compensation



Freezer Compartment		Refrigerator Compartment		Remarks
Resistance value (RCF1)	Temperature Compensation	Resistance value (RCR1)	Temperature Compensation	
180 kΩ	+5 °C	180 kΩ	+2.5 °C	Compensate to warm ↑
56 kΩ	+4 °C	56 kΩ	+2.0 °C	
33 kΩ	+3 °C	33 kΩ	+1.5 °C	
18 kΩ	+2 °C	18 kΩ	+1.0 °C	
12 kΩ	+1 °C	12 kΩ	+0.5 °C	
10 kΩ	0 °C	10 kΩ	0 °C	Reference temperature
8.2 kΩ	-1 °C	8.2 kΩ	-0.5 °C	↓ Compensate to cool
5.6 kΩ	-2 °C	5.6 kΩ	-1.0 °C	
3.3 kΩ	-3 °C	3.3 kΩ	-1.5 °C	
2 kΩ	-4 °C	2 kΩ	-2.0 °C	
470 Ω	-5 °C	470 Ω	-2.5 °C	

• Temperature Compensation Table by Resistance Adjustment (the difference compared to the present temperature)

EX) The temperature of refrigerator increases by 1 °C if refrigerator compartment compensation resistance is changed from 10 kΩ to 18 kΩ.

MICOM CIRCUIT DESCRIPTION

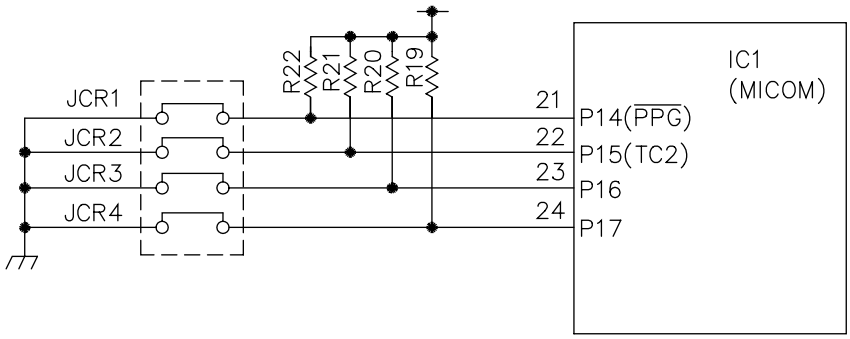
▶ Refrigerator compartment temperature compensation table is as shown below.

	Amended Resistance / Present Resistance	470 Ω	2 kΩ	3.3 kΩ	5.6 kΩ	8.2 kΩ	10 kΩ	12 kΩ	18 kΩ	33 kΩ	56 kΩ	180 kΩ
Refrigerator Compartment (RCR1)	470Ω	No change	0.5 °C Increase	1 °C Increase	1.5 °C Increase	2 °C Increase	2.5 °C Increase	3 °C Increase	3.5 °C Increase	4 °C Increase	4.5 °C Increase	5 °C Increase
	2 kΩ	0.5 °C Decrease	No change	0.5 °C Increase	1 °C Increase	1.5 °C Increase	2 °C Increase	2.5 °C Increase	3 °C Increase	3.5 °C Increase	4 °C Increase	4.5 °C Increase
	3.3 kΩ	1 °C Decrease	0.5 °C Decrease	No change	0.5 °C Increase	1 °C Increase	1.5 °C Increase	2 °C Increase	2.5 °C Increase	3 °C Increase	3.5 °C Increase	4 °C Increase
	5.6 kΩ	1.5 °C Decrease	1 °C Decrease	0.5 °C Decrease	No change	0.5 °C Increase	1 °C Increase	1.5 °C Increase	2 °C Increase	2.5 °C Increase	3 °C Increase	3.5 °C Increase
	8.2 kΩ	2 °C Decrease	1.5 °C Decrease	1 °C Decrease	0.5 ° Drop	No change	0.5 °C Increase	1 °C Increase	1.5 °C Increase	2 °C Increase	2.5 °C Increase	3 °C Increase
	10 kΩ	2.5 °C Decrease	2 °C Decrease	1.5 °C Decrease	1 °C Decrease	0.5 °C Decrease	No change	0.5 °C Increase	1 °C Increase	1.5 °C Increase	2 °C Increase	2.5 °C Increase
	12 kΩ	3 °C Decrease	2.5 °C Decrease	2 °C Decrease	1.5 °C Decrease	1 °C Decrease	0.5 °C Decrease	No change	0.5 °C Increase	1 °C Increase	1.5 °C Increase	2 °C Increase
	18 kΩ	3.5 °C Decrease	3 °C Decrease	2.5 °C Decrease	2 °C Decrease	1.5 °C Decrease	1 °C Decrease	0.5 °C Decrease	No change	0.5 °C Increase	1 °C Increase	1.5 °C Increase
	33 kΩ	4 °C Decrease	3.5 °C Decrease	3 °C Decrease	2.5 °C Decrease	2 °C Decrease	1.5 °C Decrease	1 °C Decrease	0.5 °C Decrease	No change	0.5 °C Increase	1 °C Increase
	56 kΩ	4.5 °C Decrease	4 °C Decrease	3.5 °C Decrease	3 °C Decrease	2.5 °C Decrease	2 °C Decrease	1.5 °C Decrease	1 °C Decrease	0.5 °C Decrease	No change	0.5 °C Increase
	180 kΩ	5 °C Decrease	4.5 °C Decrease	4 °C Decrease	3.5 °C Decrease	3 °C Decrease	2.5 °C Decrease	2 °C Decrease	1.5 °C Decrease	1 °C Decrease	0.5 °C Decrease	No change

- Temperature adjustment of refrigerator compartment is conducted by the same way as that of refrigerator. The temperature compensation of freezer is twice of refrigerator.
- This circuit is to input the degree of temperature compensation to MICOM in order to adjust the temperature of refrigerator.

MICOM CIRCUIT DESCRIPTION

2. Refrigerator Weak Cooling and Over Cooling Compensation Circuit



	Temperature Compensation by Cutting	
JCR1	+1 ¡	+2 ¡
JCR2	+1 ¡	
JCR3	-1 ¡	-2 ¡
JCR4	-1 ¡	

WEAK COOLING COMPENSATION		OVER COOLING COMPENSATION		REFRIGERATOR COMPARTMENT TEMPERATURE COMPENSATION	REMARKS
JCR3	JCR4	JCR1	JCR2		
				0 °C (FACTORY SHIPPING)	
CUT				-1 °C	
	CUT			-1 °C	
		CUT		+1 °C	
			CUT	+1 °C	
CUT	CUT			-2 °C	
		CUT	CUT	+2 °C	
CUT		CUT		0 °C	
CUT			CUT	0 °C	
	CUT	CUT		0 °C	
	CUT		CUT	0 °C	
CUT	CUT	CUT		-1 °C	
	CUT	CUT	CUT	+1 °C	
CUT	CUT	CUT	CUT	0 °C	

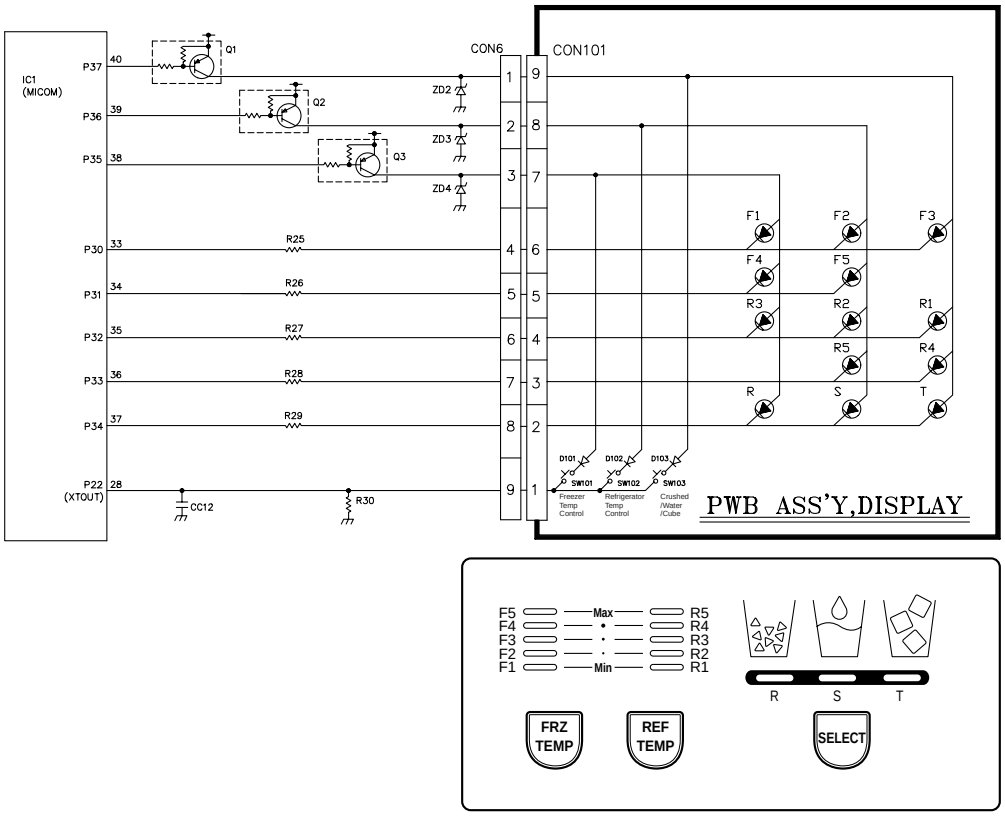
• The above option circuit is to compensate the refrigerator compartment temperature by cutting during service.

MICOM CIRCUIT DESCRIPTION

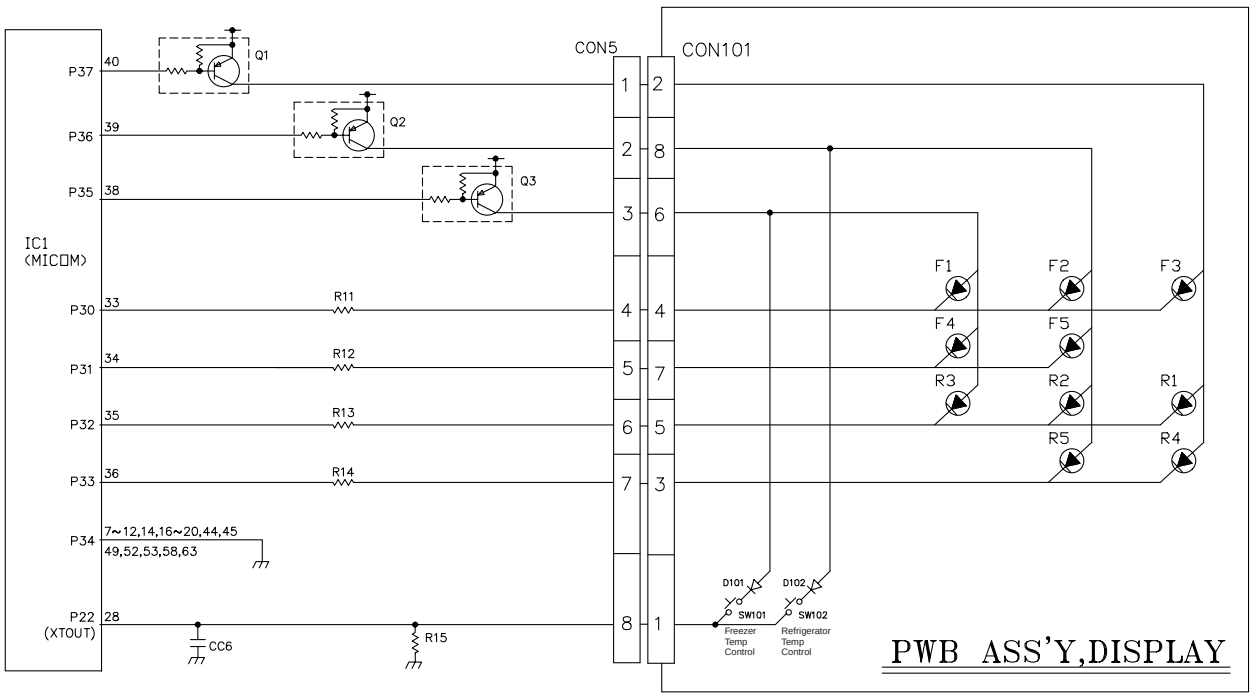
1-10. Key Button Input and Display Lighting Circuit

1. GR-P247, GR-P207, GR-L247, GR-L207

This circuit is to judge the work of function control button on the operation panel and to light each function indication led (LED module). It is driven by SCAN method.



2. GR-C247, GR-C207, GR-B247, GR-B207



MICOM CIRCUIT DESCRIPTION

2. Sensor Resistance Characteristic Table

Measured Temperature (°C)	Freezer Sensor	Refrigerator Sensor 1 and 2, Defrost Sensor and Open Air Sensor
-20 °C	22.3 kΩ	77 kΩ
-15 °C	16.9 kΩ	60 kΩ
-15 °C	13.0 kΩ	47.3 kΩ
-5 °C	10.1 kΩ	38.4 kΩ
0 °C	7.8 kΩ	30 kΩ
+5 °C	6.2 kΩ	24.1 kΩ
+10 °C	4.9 kΩ	19.5 kΩ
+15 °C	3.9 kΩ	15.9 kΩ
+20 °C	3.1 kΩ	13 kΩ
+25 °C	2.5 kΩ	11 kΩ
+30 °C	2.0 kΩ	8.9 kΩ
+40 °C	1.4 kΩ	6.2 kΩ
+50 °C	0.8 kΩ	4.3 kΩ

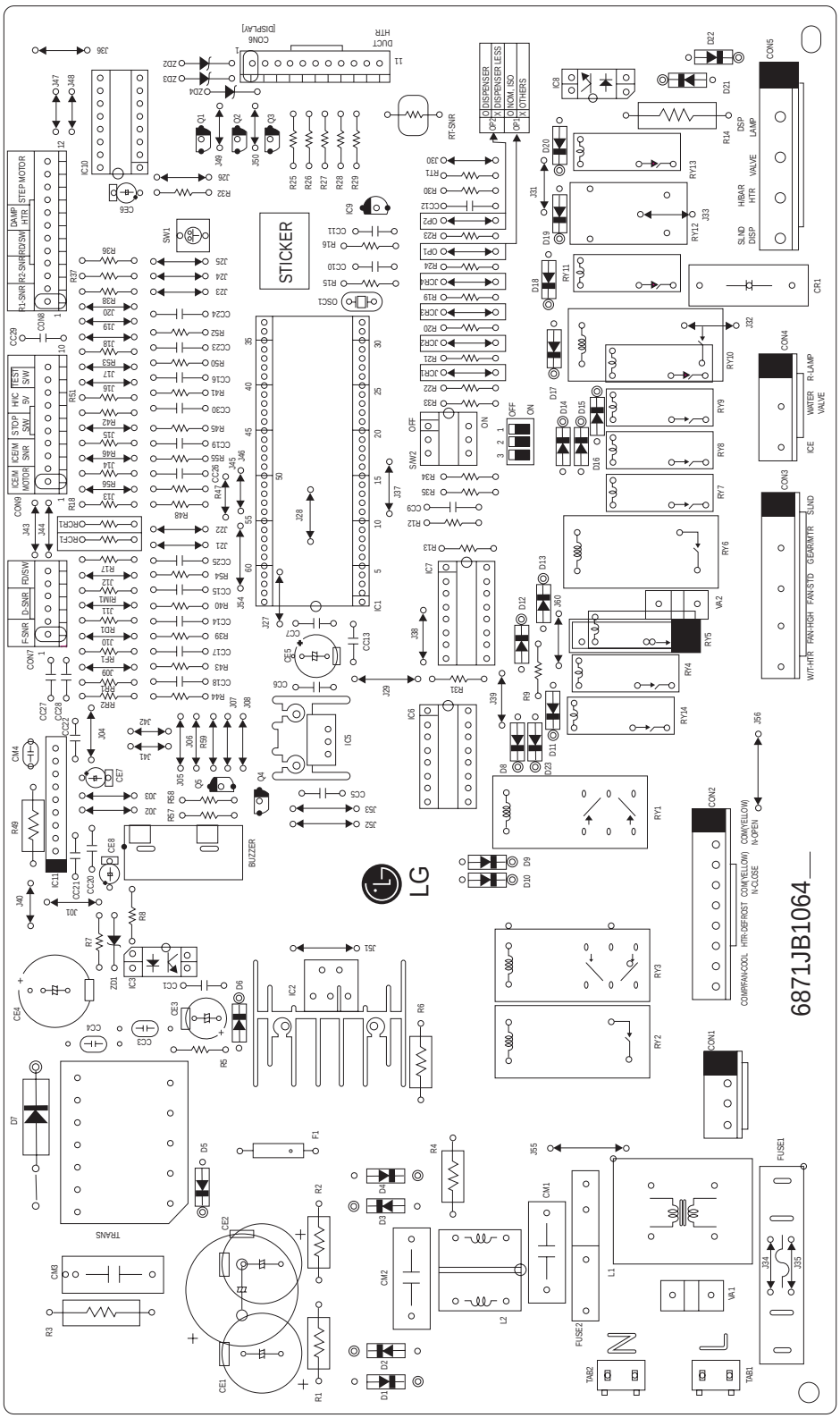
- Tolerance of sensor resistance is ±5 %.
- Leave the sensor at measuring temperature for more than 3 minutes when measuring sensor resistance. (necessary due to detecting speed)
- It is desirable to use digital tester as analogue tester has wider measuring temperature.
- Disassemble refrigerator sensor 1 and 2 from CON8 of main PWB assembly and measure it with digital tester.
- Disassemble freezer sensor from CON7 of main PWB assembly and measure it with digital tester.

MICOM CIRCUIT DESCRIPTION

3. PWB Parts Drawings and List

3-1. PWB Assembly Main Parts Drawings

1 GR-P247, GR-P207, GR-L247, GR-L207



MICOM CIRCUIT DESCRIPTION

3-2. Parts List

1. GR-P247, GR-P207 / GR-L247, GR-L207

GR-L247/207 QTY.	GR-P247/207 QTY.	WORK NO.	DWG. NO.	DESCRIPTION	SPEC'	MAKER	REMARK
1	1	1	6870JB2032A	PWB,MAIN	FR-1(DS-1107A)	DOO SAN	t=1.6
1A	1A	2	6170JB2007	TRANS,SMPS(COIL)	1.2±2mH/7.3-10.1Ω/4.5-6.6Ω	UNION	TRANS
1	1	3	6630JB8001G	WAFER	JE202-1T-04	JAE EUN	CON1
1	1	4	6630JB8001Y		JE202-1T-09		CON2
1	1	5	6630JB8001B		JE202-1T-03(SP-2,4)		CON4
		6					
1	1	7	6630JB8001D		JE202-1T-05(SP-2,4,6,8)		CON3(RED)
		8					
1	1	9	6630JB8001D		JE202-1T-05(SP-2,4,6,8)		CON5
		10				YEON HO	
1	1	11	6630JB8004E		SMW250-06		CON7
1	1	12	6630JB8004J		SMW250-10		CON9
1	1	13	6630JB8004L		SMW250-12		CON8
1	1	14	6630JB8004K		SMW250-11		CON6
1		15	0IZZJB2003C	MICOM CHIP	TMP87C841N	TOSHIBA	IC1(=0IZZJB 2003D)
	1		0IZZJB2003E		TMP87C841N		IC1(=0IZZJB 2003F)
		16	0INE780050A	REGULATOR	KIA78005AP	K.E.C	IC5
1	1		0IRH178050B		BA17805T	ROHM	
1	1	17	0IKD010100A	RESET IC	BMR0101D	KODENSHI	IC9
2	2	18	0IKE650030B	DRIVE IC	KID65003AP	K.E.C	IC6,7
1	1	19	0IT0777400A	DRIVE IC	TA7774AP	TOSHIBA (JAPAN)	IC10
1	1	20	0IRH622200A	DRIVE IC	BA6222	ROHM	IC11
1	1	21	0ISK615300A	DRIVE IC	STR-G6153T	SANKEN	IC2
		22					
1	1	23	0IT0721000A	PHOTO TR	TLP721	TOSHIBA	IC3
1	1						IC8
		24	J510-00005A	RELAY	G2R-1A-E	OMRON	
1	1	25	6920JB2005A		JW1aFHN	NAIS	RY6
			6920JB2002A		VS-12MB	TAKAMISAWA	
1	1	26	6920JB2005A		JW1aFHN	NAIS	RY2
			6920JB2004A		DH12DI-0-Q	JAEIL	
2	2	27	6920JB2007A		VSB-12TB	TAKAMISAWA	RY1,3
1	1	28	6920JB2003A		G5N-1A	OMRON	RY5
6	6	29	6920JB2003A		G5N-1A	OMRON	RY4,7,8,9 RY11,13
1	1						RY14
1	1	30	6920JB2003A		G5N-1A	OMRON	RY10 (R-LAMP)
		31	6920JB2004A		DH12DI-0-Q	JAEIL	
	1	32	6920JB2006B		UT205-12SC	YUYU	RY12(H/BAR)
1	1	33	6212AQ9002B	RESONATOR	CST4.00MGW	MURATA	OSC1 (=6212AQ9002B)
			J570-00012B		CST4.00MGW-TF01		
1	1	34	6102JB8001B	VARISTOR	INR14D621	IL JIN	VA1
		35	J572-00001D		INR14D271	IL JIN	
		36	6102AQ9075E		INR10D471	IL JIN	VA2
1	1	37	0DR107009AA	FAST RECOVER D	FR107	DELTA	D5
1	1	38	0DR302000BA		FR302		D7
		39					
5	5	40	0DD400409AC	RECTIFIER DIODE	1N4004	DELTA	D8~10,13,17
5	5	41	0DD400709AB		1N4007		D1~4,22
1	1	42					D12
8	8	43	0DD414809BB	SWITCHING DIODE	1N4148	ROHM	D6,11,14,15 16,18,20,21
	1						D19(H/BAR)
							D17(R/LAMP)
1	1						D23
1	1	44	0DZ152419AA	ZENER DIODE	1N5241B/11V	DELTA	ZD1

GR-L247/207 QTY.	GR-P247/207 QTY.	WORK NO.	DWG. NO.	DESCRIPTION	SPEC'		REMARK
1	1	45	0CE2271F638	ELE' CAPACITOR	220uF/16V	SAM HWA RUBYCON	CE5
1	1	46	0CE687AH690		680uF/25V RX TYPE		CE4
1	1	47	0CE1071H638		100uF/25V		CE7
1	1	48	0CE4761H638		47uF/25V		CE8
1	1	49	0CE1061K638		1uF/50V		CE6
1	1	50	0CE4761K638		47uF/50V		CE3
		51	0CE686AR630		68uF/250V RX TYPE		CE1,CE2
1	1	52	0CE476AK638		47uF/450V HE TYPE		CE2
1	1	53	0CQ4732Y430	MYL' CAPACITOR	473/630V		CM3
1	1	54	0CQ2231N409		223/100V	SEIL	CM4
1	1	55	0CK1020K519	CER' CAPACITOR	102/50V	TAE YANG	CC12
6	6	56	0CK1040K919		104/50V		CC5~7,9~11
18	18						CC13~30
1	1	57	0CK4710K519		471/50V		CC1
		58					
		59					
		60					
		61					
1	1	62	0CQ10418670		104/275V	PILKOR	CM2
1	1	63	0CQ10418670		104/275V		CM1
2	2	64	0CK22102510		221 /2KV	SAM HWA	CC3,4
		65	0RS2701K600	R,OXIDE FILM	2.7K /2W	(1)CHOYANG (2)SMART	
		66	0RS4702K600		47K/2W		
2	2	67	0RS5602K600		56K /2W		R3,14
		68	0RS0151J609		1.5 /1W		
		69	0RS8202J609		82K /1W		R4
1	1	70	0RS1503J609		150K /1W		R4
1	1	71	0RD0221H609	R,CARBON FILM	2.2 1/2W		R6
1	1	72	0RD0682H609		68J 1/2W		R49
		73	0RD2003H609		200K 1/2W		R1
		74	0RD2003H609		200K 1/2W		R2
1	1	75	0RD5603H609		560K 1/2W		R2
1	1	76	0RD0222G609		22 1/4W		R5
1	1	77	0RD1000G609		100 1/4W		R13
5	5	78	0RD1800G609		180J 1/4W		R25~R29
1	1	79	0RD2200G609		220 1/4W		R57
		80	0RD6200G609		620 1/4W		R9
1	1	81	0RD1001G609		1K 1/4W		R58
1	1	82	0RD1201G609		1.2K 1/4W		R8
1	1	83	0RD1801G609		1.8K 1/4W		R7
9	9	84	0RD2001G609		2K 1/4W		R31,39~46
6	6						R50,52~56
11	11	85	0RD4701G609		4.7K 1/4W		R16,19~24,32~35
4	4						R47,48,51,59
3	3	86	0RD1002G609		10K 1/4W		R12,17,18
4	4						R30,36~38
1	1	87	0RD1004G609		1M 1/4W		R15
1	1	88	0RD1002G609		10K 1/4W		RCF1
1	1	89	0RD1002G609		10K 1/4W		RCR1
		90	0RD0101J609		1 /1 W		R6
		91					
		92					
		93					
		94					
		95					
1	1	96	0RN1002G409	R,METAL FILM	10KF 1/4W		RT1
2	2	97	0RN1622G409		16.2KF 1/4W		RF1,RIM1
3	3	98	0RN2612G409		26.1KF 1/4W		RD1,RR1,2

MICOM CIRCUIT DESCRIPTION

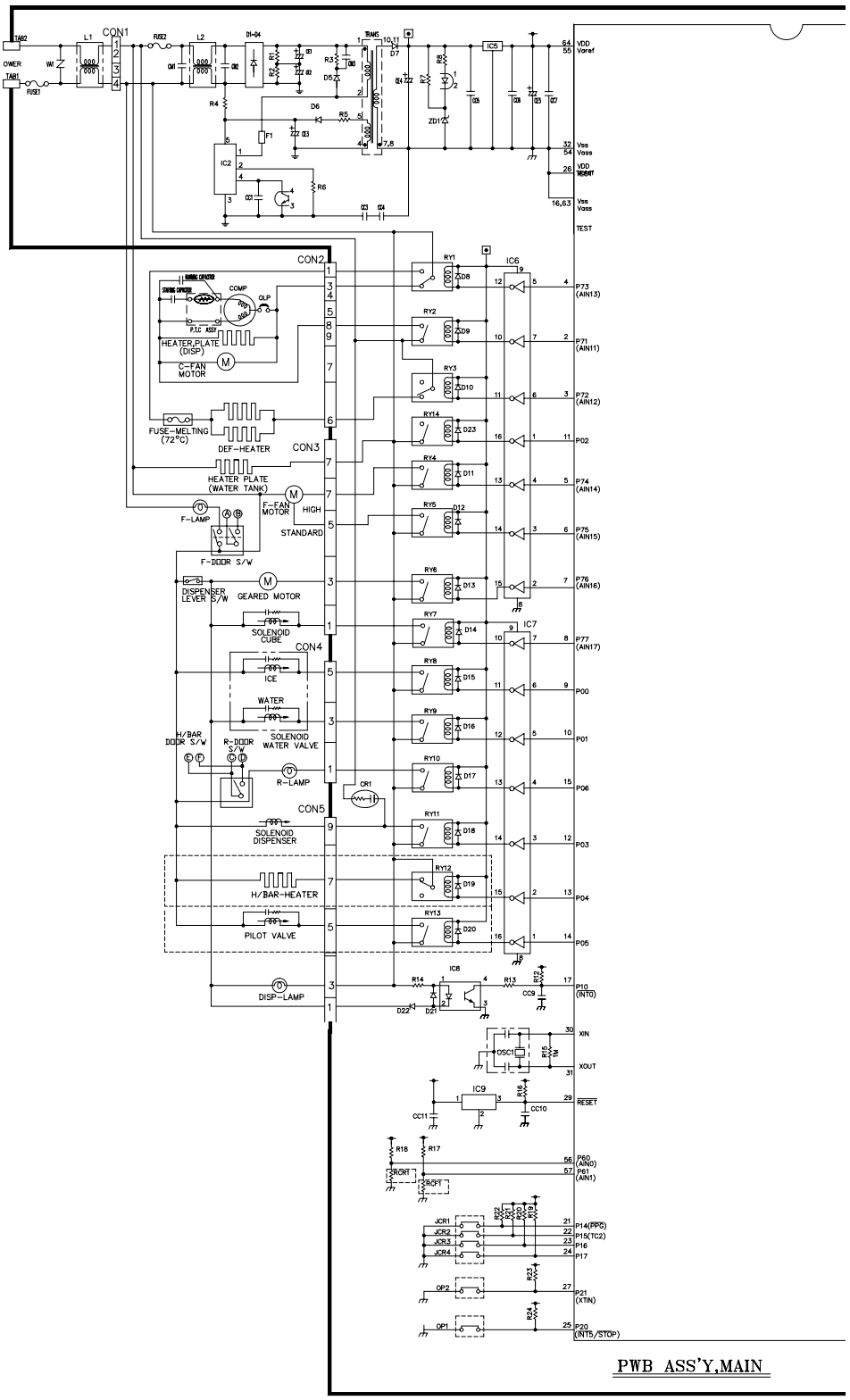
1. GR-P247, GR-P207, GR-L247, GR-L207

GR-L247/207 QTY.	GR-P247/207 QTY.	WORK NO.	DWG. NO.	DESCRIPTION	SPEC'		REMARK
1	1	99	0TR106009AC	TRANSISTOR	KTA106M	K.E.C	Q4
1	1	100	0TR106009AF		KTC106M		Q5
1	1	101	6908JB3002A	BUZZER,PIGZO CE	BM-20K	BUJEON	BUZZER
1	1	102	6210JB8001A	CORE(CIRE),BEADS	BFS3510A0	SAM HWA	F1
1	1	103	6600JB8001A	TEST S/W	SKHV10910	LG	SW1
1	1	104	6600JB8003A	DIP S/W	3P,DIP	OTAX	SW2
10	10	105	43607015	JUMP WIRE	0.6X7.5mm		J40~49
34	34				0.6X10mm		J01~31,36~37,60
							J32(R-LAMP)
							J33(H/BAR)
							J34,35(FUSE1)
1	1						FUSE2
1	1						JCR1
1	1						JCR2
1	1						JCR3
1	1						JCR4
							OP1
1	1						OP2
1	1						R9
7	7				0.6X12.5mm		J50~56
1	1						R1
1	1	106	6200JB8001A	RC FILTER	0.1uF+120/250VAC	PILKO	CR1
1	1	107	4920JB3007A	HEAT SINK(STR)			
1	1	108	4920JB3001A	HEAT SINK(5V)	(=J572-00002A)		
1	1	109	6200JB3004A	COMMON COIL	2mH	TNC	L1
		110					L1
1	1	111	6200JB3005A		32mH	UNION	L2
		112					L2
		113					
1	1	114	3J02447C	FUSE	15A/250V	SAM JU	FUSE1
2	2	115	6901JB8001A	FUSE HOLDER	FC61F		
		116	0FZZJB3001A	FUSE	2A/250V		FUSE2
		117					
2	2	118	0Q01030F	250 TAB	GP881191-2	K.E.T	TAB1,2
2	2	119	1SBF0302418	SCREW	ASSY H/SINK	TAE SUNG	
3.0g	3.0g	120	49111001	SOLDER	ALMIT KR-19RMA	DAE JIN	
25g	25g	121	49111004	SOLDER LEAD BAR	H63A		
1.5g	1.5g	122	59333105	FLUX AUTO	JS71	KOKI	
3	3	123	0TR226009AB	TRANSISTOR	KRA226M	K.E.C	Q1~Q3
1	1	124	6500JB3001A	SENSOR	PBN-43	JAMES TEC	RT-SNR
3	3	125	0DZ152349AA	ZENER DIODE	1N5234B	DELTA	ZD2~ZD4
2	2	126	43607015	JUMP WIRE	0.6*10mm		J38,39

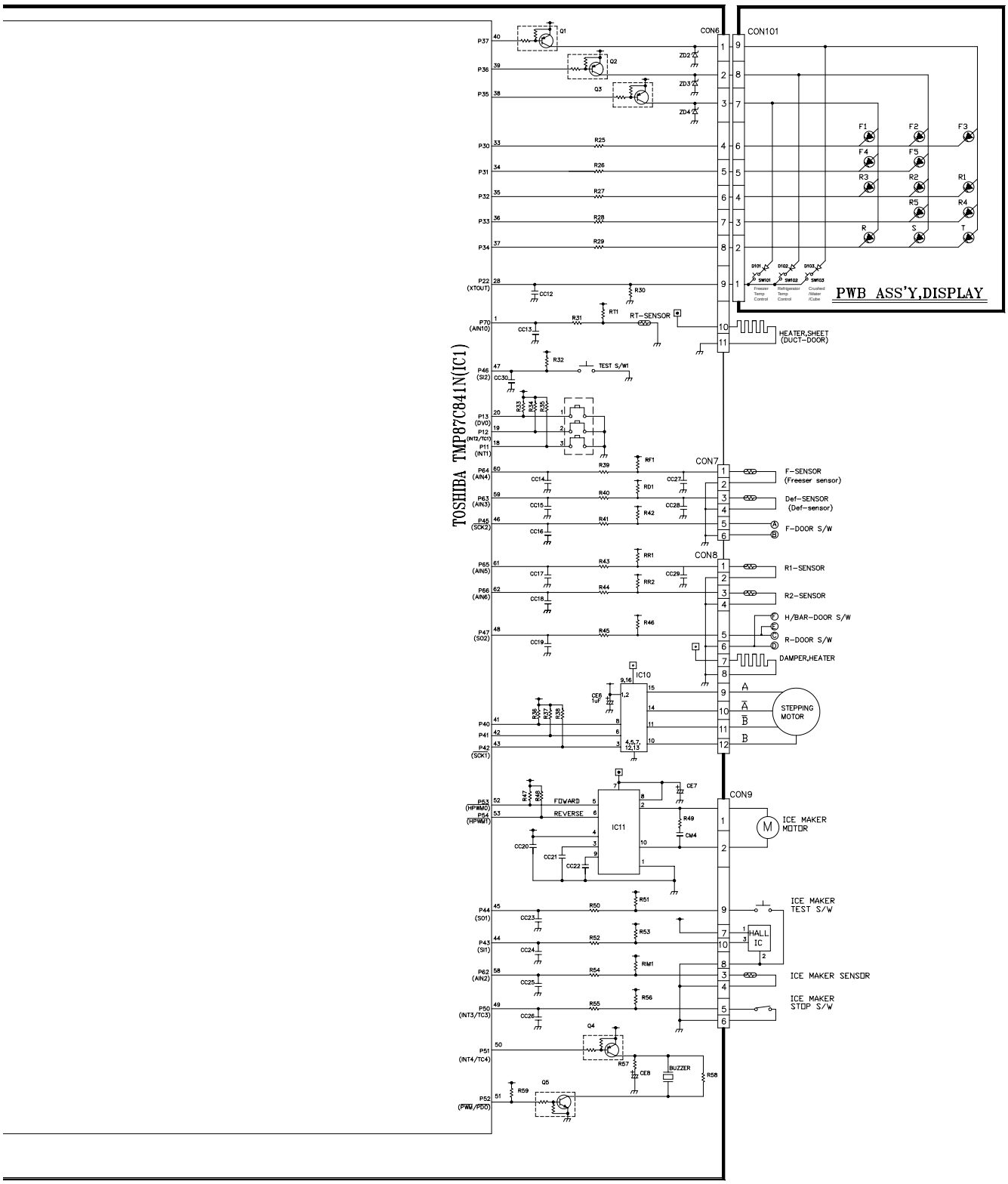
MICOM CIRCUIT DESCRIPTION

4. PWB circuit drawing- PWB circuit drawing may change depending on the conditions.

1 GR-P247, GR-P207,
GR-L247, GR-L207



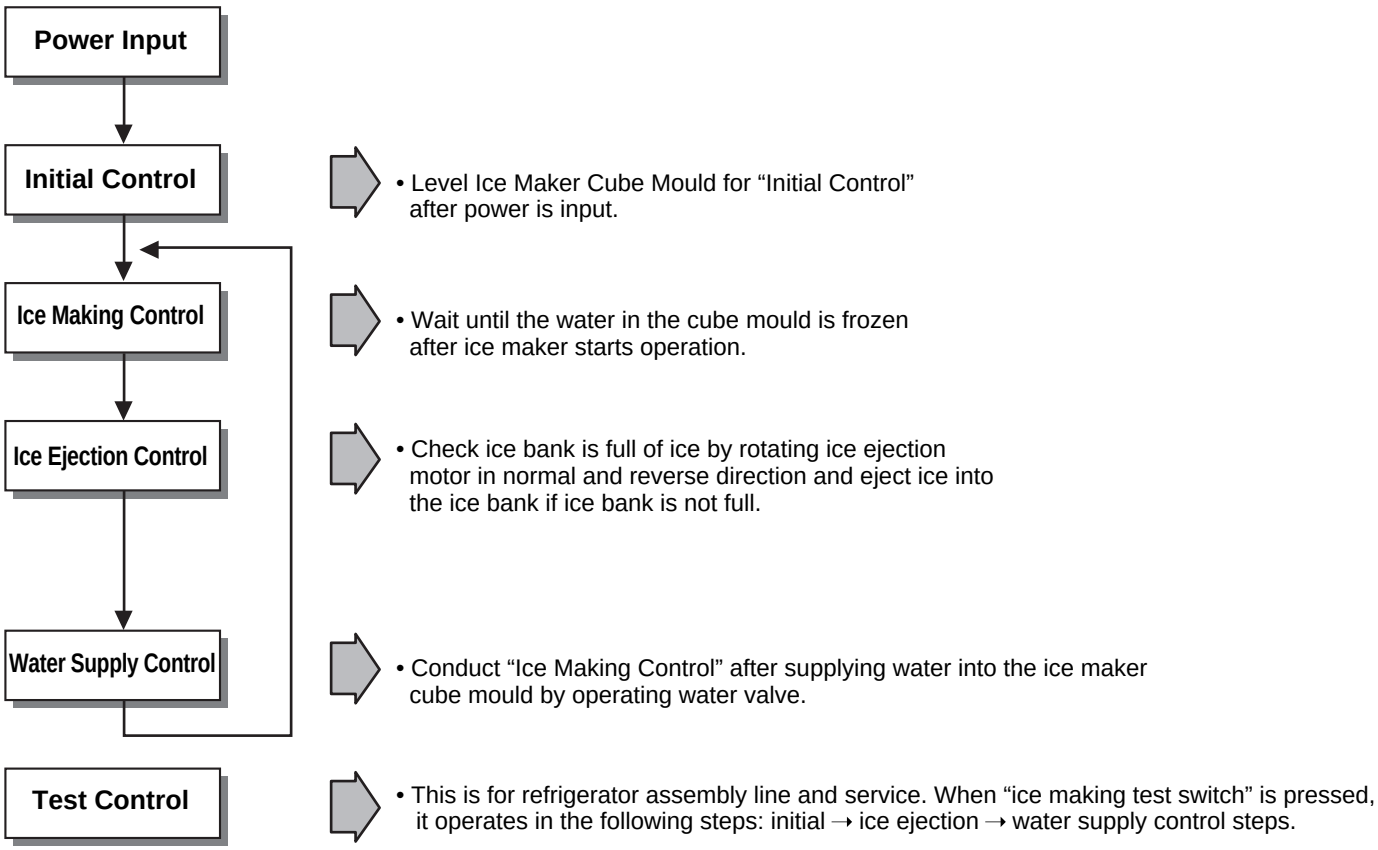
MICOM CIRCUIT DESCRIPTION



ICE MAKER AND DISPENSER WORKING PRINCIPLES AND REPAIR

1. Working Principles

1-1. Ice Maker Working Principles


Power Input
Initial Control
• Level Ice Maker Cube Mould for “Initial Control” after power is input.
Ice Making Control
• Wait until the water in the cube mould is frozen after ice maker starts operation.
Ice Ejection Control
• Check ice bank is full of ice by rotating ice ejection motor in normal and reverse direction and eject ice into the ice bank if ice bank is not full.
Water Supply Control
• Conduct “Ice Making Control” after supplying water into the ice maker cube mould by operating water valve.
Test Control
• This is for refrigerator assembly line and service. When “ice making test switch” is pressed, it operates in the following steps: initial → ice ejection → water supply control steps.

1-2. Dispenser Working Principles

1. This function is available in Model GR-P247, GR-P207 and GR-L247, GR-L207 where water and ice are available without opening freezer compartment door.
2. “Crushed Ice” is automatically selected when power is initially applied or reapplied after power cut.
3. When dispenser selection switch is continuously pressed, light is on in the following sequence: “Water” → “Cube Ice” → “Crushed Ice”.
4. Lamp is on when dispenser rubber button is pressed and vice versa.
5. When dispenser crushed ice rubber button is pressed, dispenser solenoid and geared motor work so that crushed ice can be dispensed if there is ice in the ice bank.
6. When dispenser cube ice rubber button is pressed, dispenser solenoid, cube ice solenoid and geared motor work so that cube ice can be dispensed if there is ice in the ice bank.
7. When dispenser water rubber button is pressed, water valve opens and water is supplied if water valve is normally installed on the right side of the machine room.
8. Ice and water are not available when freezer door is open.

ICE MAKER AND DISPENSER WORKING PRINCIPLES AND REPAIR

2. Function of Ice Maker

2-1. Initial Control Function

1. When power is initially applied or reapplied after power cut, it detects level of ice maker cube mould after completion of MICOM initialization. The detecting lever moves up and down.
2. The level of ice maker cube mould is judged by output signal, high and low signal, of Hall IC. Make the cube mould to be horizontal by rotating ice ejection motor in normal or reverse direction so that High/Low signal can be applied to MICOM Pin No. 44.
3. If there is no change in signals one minute after the geared motor starts to operate, it stops icemaker operation and check the signal every hour. It resets initialization of icemaker when it becomes normal.
4. It judges that the initial control is completed when it judges the ice maker cube mould is horizontal.
5. Ice ejection conducts for 1 cycle irrespect of ice in the ice bank when power is initially applied.

2-2. Water Supply Control Function

1. This is to supply water into the ice maker cube mould by operating water valve in the machine room when ice ejection control is completed and ice maker mould is even.
2. The quantity of water supplied is determined by DIP switch and time.

<Water Supply Quantity Table>

No	DIP SWITCH SETTING S/W 1	S/W 2	S/W 3	WATER SUPPLY TIME	REMARKS
1	OFF	OFF	OFF	6.5 Sec.	* The quantity of water supplied depends on DIP switch setting conditions and water pressure as it is a direct tap water connection type. (the water supplied is generally 80 cc to 120 cc) * DIP switch is on the main PWB.
2	ON	OFF	OFF	5.5 Sec.	
3	OFF	ON	OFF	6 Sec.	
4	ON	ON	OFF	7 Sec.	
5	OFF	OFF	ON	7.5 Sec.	
6	ON	OFF	ON	8 Sec.	
7	OFF	ON	ON	9 Sec.	
8	ON	ON	ON	10 Sec.	

3. If water supply quantity setting is changed while power is on, water supplies for the amended time. If DIP switch is changed during water supply, water shall be supplied for the previous setting time. But it will supply for the amended time from the next supply.
4. When water supply signal is applied to water and ice valves at the same time during water supply, water shall be supplied to water valve. If water supply signal is applied to ice valve during water supply, water shall be supplied to both water and ice valves.

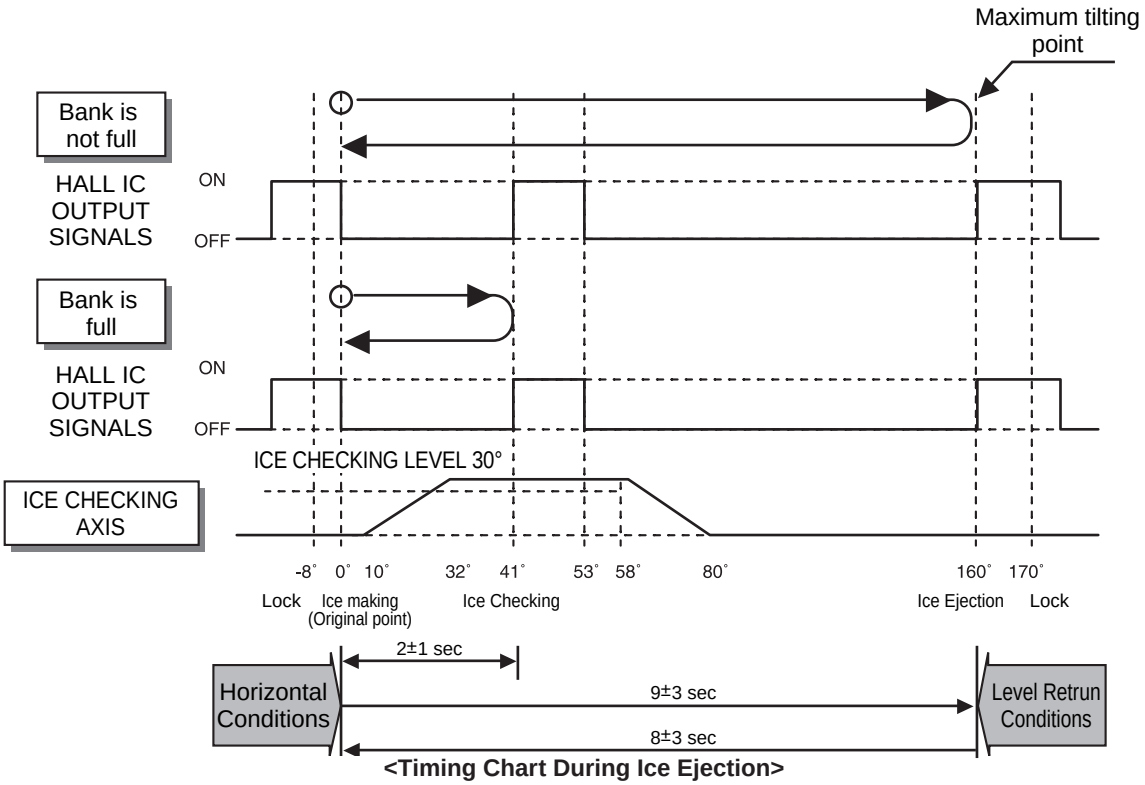
2-3. Ice Making Control Function

1. Ice making control is carried out from the completion of water supply to the completion of ice making in the cube mould. Ice making sensor detects the temperature of cube mould and completes ice making. (ice making sensor is fixed below ice maker cube mould)
2. Ice making control starts after completion of water supply control or initial control.
3. It is judged that ice making is completed when ice making sensor temperature reaches at -8°C after 100 minutes when water is supplied to ice maker cube mould.
4. It is judged that ice making is completed when ice maker sensor temperature reaches below -12 °C after 20 minutes in condition 3.

ICE MAKER AND DISPENSER WORKING PRINCIPLES AND REPAIR

2-4. Ice Ejection Control Function

1. This is to eject ice from ice maker cube mould after ice making is completed.
2. If Hall IC signal is on within 3.6 seconds after ice ejection motor rotates in normal direction, it does not proceed ice ejection but waits. If the ice bank is full, ice ejection motor rotates in normal direction in every hour to check the condition of ice bank. If the ice bank is not full, the water supply control starts after completion of ice ejection control. If the ice bank is full, ice ejection motor rotates in reverse direction and sops under ice making or waiting conditions.
3. If ice bank is not full, ice ejection starts. The cube mould tilts to the maximum and ice is separated from the mould and ice checking lever raises.
4. Ice ejection motor stops for 1 second if Hall IC signal changes from OFF (low) to ON (high) after 3.6 seconds when ice ejection motor rotates in normal direction. If there is no change in Hall IC signals within 1 minute after ice ejection motor operates, ice ejection motor stops as ice ejection motor or hall IC is out of order.
5. If ice ejection motor or Hall IC is abnormal, ice ejection motor rotates in normal direction to exercise initial operation. It resets the ice maker if ice ejection motor or Hall IC is normal.
6. The mould stops for 1 second at maximum tilted conditions.
7. The mould returns to horizontal conditions as ice ejection motor rotates in reverse direction.
8. When the mould becomes horizontal, the cycle starts to repeat:
   Water Supply → Ice Making → Ice Ejection → Mould Returns to Horizontal



<Timing Chart During Ice Ejection>

ICE MAKER AND DISPENSER WORKING PRINCIPLES AND REPAIR

2-5 Test Function

1. It is to force the operation during operation test, service, and cleaning. The test switch is mounted under the automatic ice maker. The test function starts when the test switch is pressed for more than 0.5 second.
2. Test button does not work during ice ejection and water supply. It works when it is in the horizontal conditions. If mould is full of ice during test function operation, ice ejection control and water supply control do not work.
3. When test switch is pressed for more than 0.5 second in the horizontal conditions, ice ejection starts irrespect of the mould conditions. Water shall be splashed if test switch is pressed before the water in the mould freezes. Water shall be supplied while the mould returns to the horizontal conditions after ice ejection. Therefore the problems of ice ejection, returning to the horizontal conditions, and water supply can be checked by test switch. When test function performs normally, buzzer sounds and water supply shall carry out. Check it for repair if buzzer does not sound.
4. When water supply is completed, the cycle operates normally as follows: Ice making → Ice ejection → Returning to horizontal conditions → Water supply
5. Remove ice from the ice maker cube mould and press test switch when ice maker cube mould is full of ice as ice ejection and water supply control do not work when cube mould is full of ice.

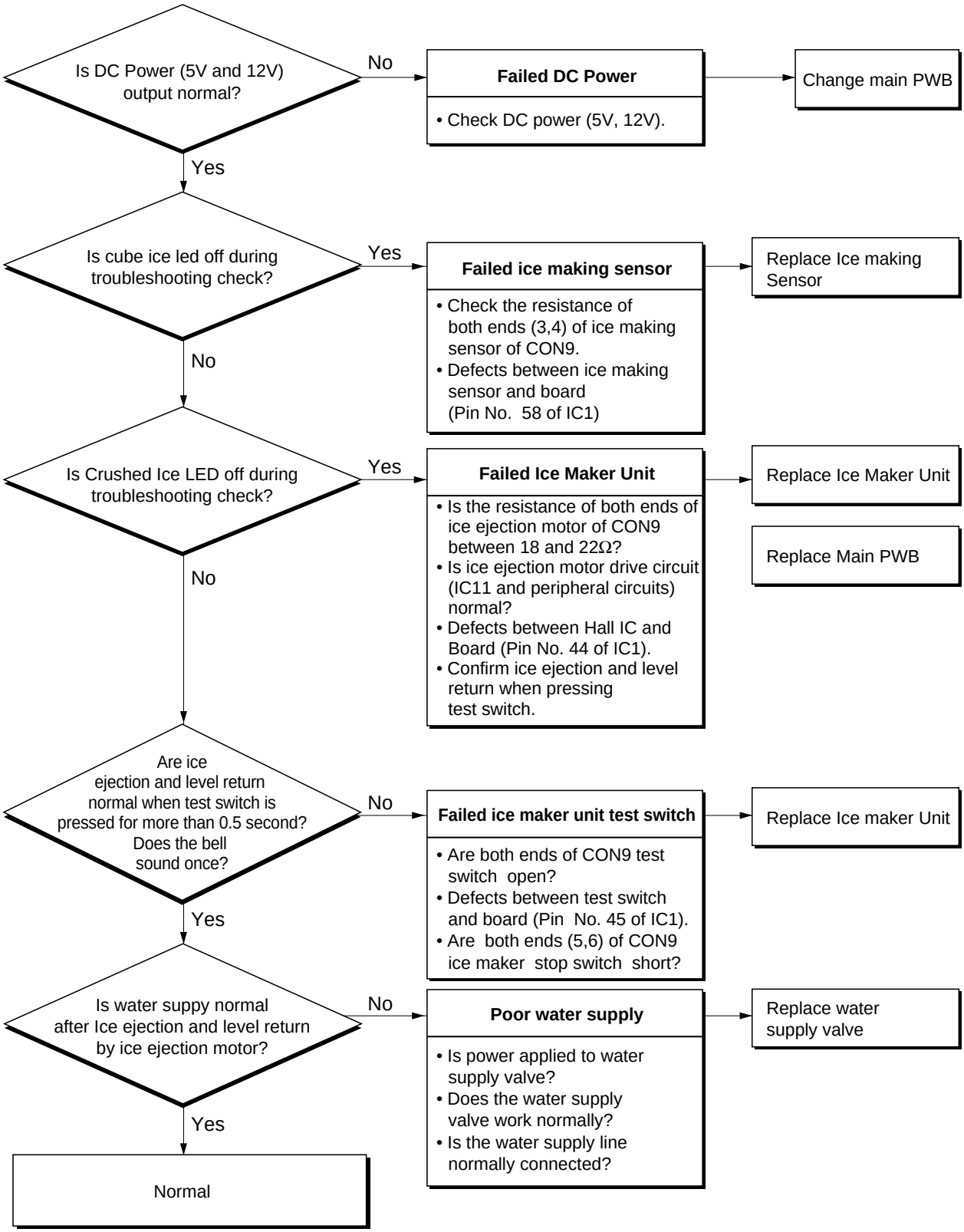
2-6. Other functions relating to freezer compartment door opening

1. When freezer door is open, ice dispenser stops in order to reduce noise and ice drop.
2. When freezer door is open during ice ejection and cube mould returning to horizontal condition, ice ejection and cube mould level return proceed.
3. When freezer door is open, geared motor and cube ice solenoid immediately stop and duct door solenoid stops after 5 seconds.
4. Water dispenser stops in order to protect water drop when freezer door is open.
5. Test function operates normally irrespect of refrigearator compartment door opening.

ICE MAKER AND DISPENSER WORKING PRINCIPLES AND REPAIR

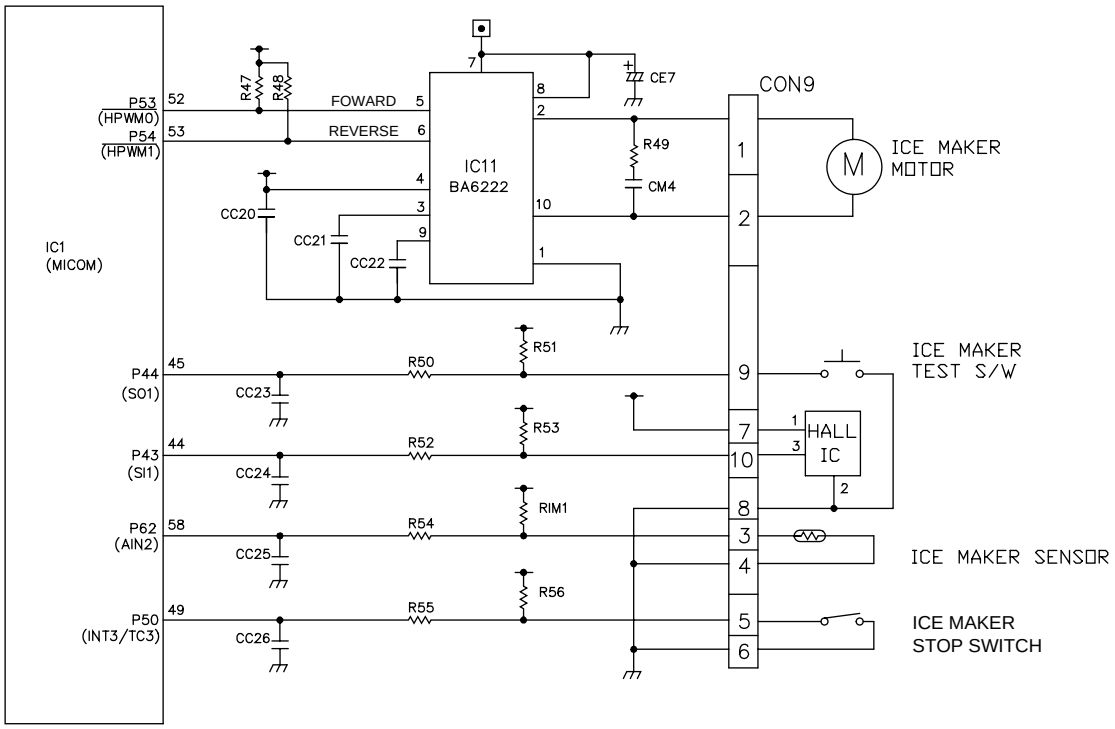
3. Ice Maker Troubleshooting

*** Troubleshooting:** it is possible to confirm by pressing freezer and refrigerator temperature control buttons for more than 1 second. (ice maker is normal if all leds are on): refer to trouble diagnposis function in MICOM function 2-8 (page 18)


Is DC Power (5V and 12V) output normal?
No
Failed DC Power
• Check DC power (5V, 12V).
Change main PWB
Yes
Is cube ice led off during troubleshooting check?
Yes
Failed ice making sensor
• Check the resistance of both ends (3,4) of ice making sensor of CON9.
• Defects between ice making sensor and board (Pin No. 58 of IC1)
Replace Ice making Sensor
No
Is Crushed Ice LED off during troubleshooting check?
Yes
Failed Ice Maker Unit
• Is the resistance of both ends of ice ejection motor of CON9 between 18 and 22Ω?
• Is ice ejection motor drive circuit (IC11 and peripheral circuits) normal?
• Defects between Hall IC and Board (Pin No. 44 of IC1).
• Confirm ice ejection and level return when pressing test switch.
Replace Ice Maker Unit
Replace Main PWB
No
Are ice ejection and level return normal when test switch is pressed for more than 0.5 second? Does the bell sound once?
No
Failed ice maker unit test switch
• Are both ends of CON9 test switch open?
• Defects between test switch and board (Pin No. 45 of IC1).
• Are both ends (5,6) of CON9 ice maker stop switch short?
Replace Ice maker Unit
Yes
Is water suppy normal after Ice ejection and level return by ice ejection motor?
No
Poor water supply
• Is power applied to water supply valve?
• Does the water supply valve work normally?
• Is the water supply line normally connected?
Replace water supply valve
Yes
Normal

ICE MAKER AND DISPENSER WORKING PRINCIPLES AND REPAIR

4. Ice Maker Circuits



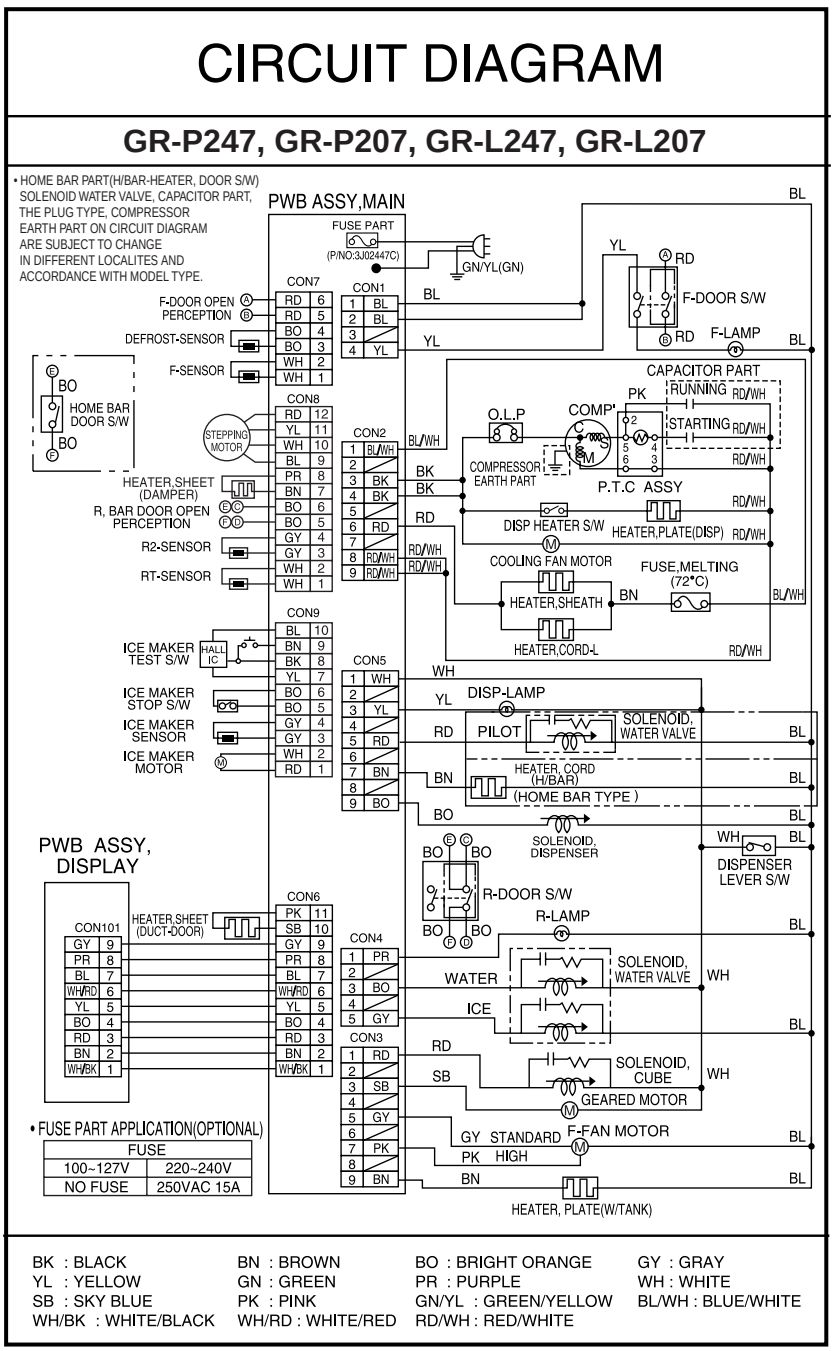
The above ice maker circuits are applied to GR-P247, GR-P207 and GR-L247, GR-L207 and composed of ice maker unit in the freezer and ice maker driving part of main PWB. Water is supplied to the ice maker cube mould through the solenoid relay for ice valve of solenoid valve in the machine room by opening valve for the set time. Water supply automatically stops when water supply time is elapsed. This circuit is to realize the functions such as ice ejection of ice maker cube mould, ice full detection, leveling, ice making temperature detection, etc. Refer to the temperature detecting circuits of Main PWB for ice making temperature detection. Ice maker test switch input detection is the same as the door switch input detection circuit of main PWB.

1. It is to force to operate during operation test, service, and cleaning. The test switch is mounted under the automatic ice maker. The test function starts when the test switch is pressed for more than 0.5 second.
2. Test button does not work during ice ejection and water supply. It works when it is in the horizontal conditions. If cube mould is full of ice during test function operation, ice ejection control and water supply control do not work.
3. Ice ejection carries out irrespect of ice formation in the ice making tray if test switch is pressed for more than 0.5 second. Water shall be splashed if test switch is pressed before the water in the mould is completely frozen. Water shall be supplied while the mould returns to the horizontal conditions after ice ejection. Therefore the problems of ice ejection, leveling, and water supply can be checked by test switch. When test function performs normally, buzzer sounds and water supply shall carry out. Check it for repair if buzzer does not sound.
4. When water supply is completed, normal cycle works: Ice Making → Ice Ejection → Level Return → Water Supply.
5. If ice maker stop switch is set to ON, normal cycle operates: Ice Making → Ice Ejection → Level Return → Water Supply. If it is set to OFF, ice making conducts but ice ejection, level return, and water supply do not work.

CIRCUIT

CIRCUIT DIAGRAM

GR-P247, GR-P207, GR-L247, GR-L207



BK : BLACK	BN : BROWN	BO : BRIGHT ORANGE	GY : GRAY
YL : YELLOW	GN : GREEN	PR : PURPLE	WH : WHITE
SB : SKY BLUE	PK : PINK	GN/YL : GREEN/YELLOW	BL/WH : BLUE/WHITE
WH/BK : WHITE/BLACK	WH/RD : WHITE/RED	RD/WH : RED/WHITE	

TROUBLE DIAGNOSIS

1. TROUBLE SHOOTING

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK

1. Faulty start	1) No power on outlet.
	2) No power on cord.
	- Bad connection between adapter and outlet. (faulty adapter)
	  - The Inner diameter of adapter.
	  - The distance between holes.
	  - The distance between terminals.
	  - The thickness of terminal.
	- Bad connection between plug and adapter (faulty plug).
	  - The distance between pins.
	  - Pin outer diameter.
	3) Shorted start circuit.
	- No power on power cord.
	  - Disconnected copper wire.
	  - Power cord is disconnected.
	  - Faulty soldering.
	  - Internal electrical short.
	  - Faulty terminal contact.
	  - Loose contact.
	  - Large distance between male terminal.
	  - Thin female terminal.
	  - Terminal disconnected.
	  - Bad sleeve assembly.
	  - Disconnected.
	  - Weak connection.
	  - Short inserted cord length.
	  - Worn out tool blade.
	- O.L.P is off.
	  - Capacity of O.L.P is small.
	  - Characteristics of O.L.P is bad.
	  - Bad connection.
	  - Power is disconnected.
	  - Inner Ni-Cr wire blows out.
	  - Bad internal connection.
	  - Faulty terminal caulking (Cu wire is cut).
	  - Bad soldering.
	- No electric power on compressor. - Faulty compressor.
	- Faulty PTC.
	  - Power does not conduct. - Damage.
	  - Bad characteristics. - Initial resistance is big.
	  - Bad connection with compressor.
	  - Too loose.
	  - Assembly is not possible.
	  - Bad terminal connection.
	4) During defrost.
	- Start automatic defrost.
	- Cycle was set at defrost when the refrigerator was produced.
		* Measuring instrument : Multi tester
		■ Check the voltage.
		If the voltage is within ±85% of the rated voltage, it is OK.
		■ Check the terminal movement.
		■ Check both terminals of power cord.
		Power conducts : OK.
		No power conducts : NG
		■ Check both terminals of O.L.P.
		If power conducts : OK.
		If not : NG.
		■ Check the resistance of both terminals.
		At normal temperature 6 : OK.
		If disconnected : ∞.

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
2. No cooling.	2) Refrigeration system is clogged.	■ Check the clogged evaporator by heating (as soon as the cracking sound begins, the evaporator start freezing)

- Moisture clogged.
  - Residual moisture in the evaporator.
    - Air Blowing.
      - Not performed.
      - Too short.
      - Impossible moisture confirmation.
      - Low air pressure.
    - Leave it in the air.
      - During rest time.
      - After work.
    - Caps are missed.
  - Residual moisture.
    - Not dried in the compressor.
    - Elapsed more than 6 months after drying
    - Caps are missed.
    - No pressure when it is open.
- No electric power on therm-ostat.
  - Insufficient drier capacity.
    - Dry drier - Drier temperature.
    - Leave it in the air.
      - Check on package condition.
      - Good storage after finishing.
  - Residual moisture in pipes.
    - Caps are missed.
      - During transportation.
      - During work.
    - Air blowing.
      - Not performed.
      - Performed.
        - Too short time.
        - Low air pressure.
        - Less dry air.
  - Moisture penetration into the refrigeration oil. - Leave it in the air. - Moisture penetration.
- Weld joint clogged.
  - Short pipe insert.
  - Pipe gaps.
    - Too large.
    - Damaged pipes.
  - Too much solder.
- Drier cloggeing.
  - The capillary tube inserted depth. - Too much.
  - Capillary tube melts. - Over heat.
  - Clogged with foreign materials.
    - Desiccant powder.
    - Weld oxides.
    - Drier angle.
  - Reduced cross section by cutting. - Squeezed.
- Foreign material clogging.
  - Compressor cap is disconnected.
  - Foreign materials are in the pipe.

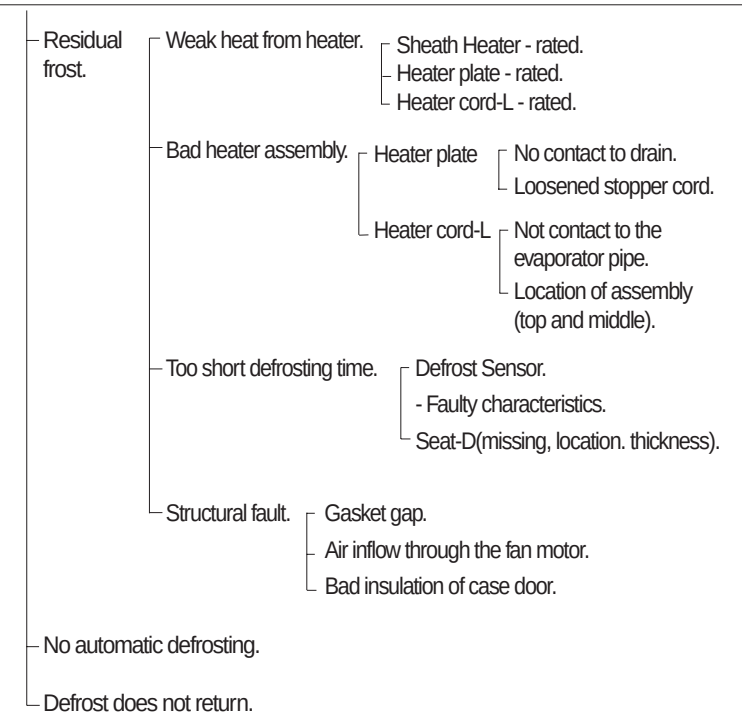
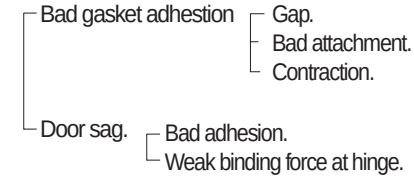
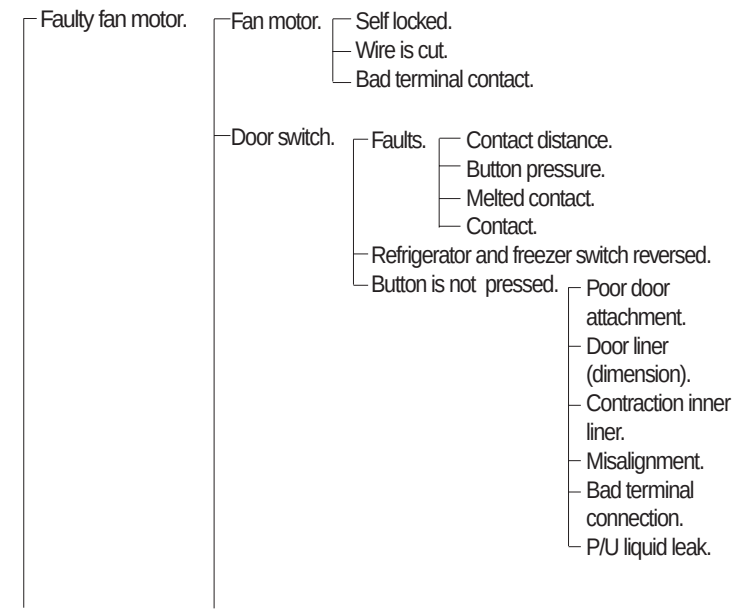
■ The evaporator does not cool from the beginnig (no evidece of misture attached).
The evaporator is the same as before even heat is applied.

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK

3. Refrigeration is weak.	1) Refrigerant Partly leaked.
	- Weld joint leak.
	- Parts leak.
	
	2) Poor defrosting capacity.
	- Drain path (pipe) clogged.
	  - Inject P/U into drain hose.
	  - Inject through the hole.
	  - Seal with drain.
	  - Foreign materials penetration.
	  - P/U lump input.
	  - Screw input.
	  - Other foreign materials input.
	  - Cap drain is not disconnected.
	- Defrost heater does not generate heat.
	  - Parts disconnected.
	  - Plate heater
	  - Wire is cut.
	  - Heating wire.
	  - Contact point between heating and electric wire.
	  - Dent by fin evaporator.
	  - Poor terminal contacts.
	  - Cord heater
	  - Wire is cut.
	  - Lead wire.
	  - Heating wire.
	  - Contact point between heating and electric wire.
	  - Heating wire is corroded
	  - Water penetration.
	  - Bad terminal connection.
		■ Check visually.
		
		■ Check terminal
		Conduction: OK.
		No conduction: NG.
		If wire is not cut, refer to resistance.
		P=Power
		V=Voltage
		R=Resistance
		$P=\frac{V^2}{R}$
		$R=\frac{V^2}{P}$

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
3. Refrigeration is weak.	 3) Cooling air leak.  4) No cooling air circulation. 	■ Check the fan motor conduction: OK. No conduction: NG.

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK

3. Refrigeration is weak.	4) No cooling air circulation.
	- Faulty fan motor. — Fan is constrained.
	  - Fan shroud contact. - Clearance.
	  - Damping evaporator contact.
	  - Accumulated residual frost.
	- Small cooling air discharge.
	  - Insufficient motor RPM
	  - Fan overload. - Fan misuse.
	  - Bad low termperature RPM characteristics.
	  - Rated power misuse.
	  - Low voltage.
	  - Faulty fan.
	  - Fan misuse.
	  - Bad shape.
	  - Loose connection. - Not tightly connected.
	  - Insert depth.
	  - Shorud. — Bent.
	  - Ice and foreign materials on rotating parts.
	5) Compressor capacity.
	- Rating misuse.
	- Small capacity.
	- Low valtage.
	6) Refrigerant too much or too little.
	- Malfunction of charging cylinder.
	- Wrong setting of refrigerant.
	- Insufficient compressor. - Faulty compressor.
	7) Continuous operation
	- No contact of temperature controller. - Foreign materials.
	8) Damper opens continuously.
	- Foreign materials jammed.
	  - P/U liquid dump.
	  - EPS water sediment.
	  - Screw.
	- Failed sensor. - Position of sensor.
	- Characteristics of damper.
	  - Bad characteristics of its own temperatue.
	  - Parts misuse.
	  - Charge of temperature - Impact. characteristics.
	9) Food storing place. - Near the outlet of cooling air.
		■ Check visually after disassembly.
		■ Check visually after disassembly.

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
4. Warm refrigerator compartment temperature.	1) Colgged cooling path. - P/U liquid leak. - Foreign materials. — P/U dump liquid. 2) Food storate. - Store hot food. - Store too much at once. - Door open. - Packages block air flow.	

5. No automatic operation. (faulty contacts.)	1) Faulty temperature sensor in freezer or refrigerator compartment.
	- Faulty contact.
	- Faulty temperature characteristics.
	2) Refrigeration load is too much.
	- Food.
	  - Too much food.
	  - Hot food.
	- Frequent opening and closing.
	- Cool air leak.
	- Poor door close. – Partly opens.
	3) Poor insulation.
	4) Bad radiation.
	- High ambient temperature.
	- Space is secluded.
	
	5) Refrigerant leak.
	6) Inadequate of refrigerant.
	7) Weak compressor discharging power.
	- Different rating.
	- Small capacity.
	8) Fan does not work.
	9) Button is positioned at "strong."
		■ Inspect parts measurements and check visually.

6. Dew and ice formation.	1) Ice in freeezer compartment.
	- External air inflow. — Rubber motor assembly direction(reverse).
	- Door opens but not closes.
	  - Weak door closing power.
	  - Stopper malfunction.
	  - Door sag.
	  - Food hinders door closing.
	- Gap around gasket. — Contraction, distortion, loose, door twisted, corner not fully inserted.
	- Food vapor. — Storing hot food. — Unsealed food.
	
	2) Condensation in the refrigerator compartment.
	- Door opens but not closes.
	  - Insufficient closing.
	  - Door sag.
	  - Food hinders door closing.
	- Gasket gap.
	
	3) Condensation on liner foam.
	- Cool air leak and transmitted.
	  - Not fully filled.
	  - Toop table part.
	  - Out plate R/L part.
	  - Flange gap. — Not sealed.
	  - Gasket gap.	

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
6. Dew and ice formation.	4) Dew on door. - Dew on the duct door. - Duct door heater is cut. - Dew on the dispense recess. — Recess Heater is cut. / Duct door is open. / Foreign material clogging. - Dew on the door surface. — Not fully filled. — Surface. / Cormer. — Liquid shortage. / Liquid leak. P/U liquid contraction. — Liquid shortage. / Liquid leak. - Dew on the gasket surface. — Bad wing adhesion. — Wing sag(lower part). / Door liner shape mismatch. Corner. — Too much notch. / Broken. Home Bar heater is cut. 5) Water on the floor. - Dew in the refrigerator compartment. - Defrosted water overflows. — Clogged discharging hose. - Discharging hose location. — Evaporation tray located at wrong place. - Tray drip. — Damaged. / Breaks, holes. / Small Capacity. - Position of drain.	
7. Sounds	1) Compressor compartment operating sounds. - Compressor sound inserted. — Sound from machine itself. / Sound from vibration. Restrainer. Rubber seat. — Too hard. / Distorted. / Aged. / Burnt. Stopper. — Bad Stopper assembly. — Not fit (inner diameter of stopper). / Tilted. / Not Compressor base not connected. Bad welding compressor stand(fallen). Foreign materials in the compressor compartment. - O.L.P. sound. — Chattering sound. Insulation paper vibration. - Capacitor noise. Pipe sound. — Pipe contacts each other. – Narrow interval. No vibration damper. — Damping rubber-Q. / Damping rubber-S. Capillary tube unattached.	

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
7. Sounds	1) Compressor compartment operating sounds. Transformer sound. — Its own fault. — Core gap. Bad connection. — Correct screw connection. Drip tray vibration sound. — Bad assembly. Distortion. Foreign materials inside. Back cover machine sound. — Bad connection. Partly damaged. Condenser drain sound. — Not connected. Bad pipe caulking. 2) Freezer compartment sounds. Fan motor sound. — Normal operating sound. Vibration sound. — Aged rubber seat. Bad torque for assembling motor bracket. Sounds from fan contact. — Fan guide contact. Shroud burr contact. Damping evaporator contact. Residual frost contact. — Poor treatment Cord heater. Narrow evaporator interval. Unbalance fan sounds. — Unbalance. — Surface machining conditions. Fan distortion. Misshappen. Burr. Ice on the fan. — Air intake (opposite to motor rubber assembly.) Motor shaft contact sounds. — Supporter disorted. Tilted during motor assembly. Resonance. Evaporator noise. — Evaporator pipe contact. — No damping evaporator. Sound from refrigerant. — Stainless steel pipe shape in accumulator. Sound from fin evaporator and pipe during expansion and contraction. 3) Bowls and bottles make contact on top shelf. 4) Refrigerator roof contact. 5) Refrigerator side contact. 6) Insufficient Lubricants on door hinge.	

TROUBLE DIAGNOSIS

CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
8. Faulty lamp (freezer and refrigerator compartment).	1) Lamp problem. — Filament blows out. / Glass is broken. 2) Bad lamp assembly. — Not inserted. / Loosened by vibration. 3) Bad lamp socket. Disconnection. — Bad soldering. / Bad rivet contact. Short. — Water penetration. — Low water level in tray. Bad elasticity of contact. Bad contact(corrosion). 4) Door switch. — Its own defect. / Refrigerator and freezer switch is reversed. / Travlel distance. / Bad connection. / Bad terminal contact. / P/U liquid leak..	
9. Faulty internal voltage(short).	1) Lead wire is damaged. Wire damage when assembling P.T.C. Cover. Outlet burr in the bottom plate. Pressed by cord heater. lead wire, evaporator pipe. 2) Exposed terminal. Compressor Compartment terminal. - Touching other components. Freezer compartment terminal. - Touching evaporator pipe. 3) Faulty parts. Transformer. — Coil contacts cover. / Welded terminal parts contact cover. Compressor. — Bad coil insulation. Plate heater. Melting fuse. — Sealing is broken. — Moisture penetration. Cord heater. — Pipe damaged. — Moisture penetration. / Bad sealing. Sheath heater.	■ Connect conduction and non-conduction parts and check with tester. Conduction: NG. Resistance∞: OK.

TROUBLE DIAGNOSIS

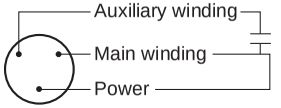
CLAIMS.	CAUSES AND CHECK POINTS.	HOW TO CHECK
10. Structure, appearance and others.	1) Door foam. Sag. — Weak torque of hinge connection. — Bolt is loosened during transportaion. Not tightly fastened. Screw worn out . Weak gasket adhesion. — Adhesion surface. Fixed tape. — Not well fixed. Noise during operation. — Hinge interference. — Bigger door foam. Hinge-Pin tilted-Poor flatness. No washer. No grease and not enough quantity. Malfunction. — Not closed Interference between door liner and inner liner. Refrigerator compartment is opened when freezer compartment is closed (faulty stopper). — Stopper worn out. Bad freezer compartment door assembly. No stopper. 2) Odor. Temperature of refrigerator compartment. — High. — Faulty damper control. Button is set at "weak". Door is open (interference by food). Deodorizer. — No deodorizer. Poor capacity. Food Storage. — Seal condition. Store special odorous food. Long term storage. Others. — Odors from chemical procucts.	

2. Faults

2-1. Power

Problems	Causes	Checks	Measures	Remarks
No power on outlet.	- Power cord cut. - Faulty connector insertion. - Faulty connection between plug and adapter.	- Check the voltage with tester. - Check visually. - Check visually.	-Replace the components. -Reconnect the connecting parts. - Reconnect the connecting parts.	
Fuse blows out.	- Short circuit by wrong connection. - Low voltage products are connected to high voltage. - Short circuit by insects. - Electricity leakage. - High voltage. - Short circuit of components (tracking due to moisture and dust penetration).	- Check the fuse with tester or visually. - Check the input volt are with tester (between power cord and products). - Check the resistance of power cord with testerf (if it is 0Ω, it is shorted).	- Find and remove the cause of problem(ex. short, high voltage, low voltage). - Replace with rated fuse.	- Replace with rated fuse after confirming its specification. ■ If fuse blowns out frequently, reconfirm the cause and prevent.

2-2. Compressor

Problems	Causes	Checks	Measures	Remarks
Compressor does not operate.	- Faulty PTC.	- Check the resistance. Vlaue:∞ is defective.	- If resistance is infinite, replace it with new one. - If it is not infinite, it is normal. - Check other parts.	
	- Compressor is frozen.	- If compressor assembly parts are normal(capacitor, PTC, OLP), apply power directly to the compressor to force operation.  OLP It starts as soon as it is contacted.	- During forced operation: - Operates: Check other parts. - Not operate: Replace the frozen compressor with new one, weld, evacuate, and recharge refrigerant. • Refer to weld repair procedures.	

2-3. Temperature

Problems	Causes	Checks	Measures	Remarks
High temperature in the freezer compartment.	Poor cool air circulation due to faulty fan motor.	- Lock — Check resistance with a tester. 0Ω: short. ∞Ω: cut. - Rotate rotor manually and check rotation. - Wire is cut. - Bad terminal contact: Check terminal visually. - Fan constraint. – Fan shroud contact: Confirm visually. – Fan icing: Confirm visually.	- Replace fan motor. - Reconnect and reinsert. - Maintain clearance and remove ice (Repair and/or replace shroud if fan is constrained by shroud deformation).	
	Faulty fan motor due to faulty door switch operation.	- Iced button (faulty) operation: Press button to check - Faulty button pressure and contact: Press button to check operation. - Door cannot press door switch button: Check visually.	- Confirm icing causes and repair. - Replace door switch. - Door sag: fix door. - Door liner bent:replace door or attach sheets.	
	Bad radiation conditions in compressor compartment.	- Check the clearance between the refrigerator and wall (50 mm in minimum). - Check dust on the grill in compressor compartment. - Check dust on the coils condenser.	- Keep clearance between refrigerator and walls (minimum 50mm). - Remove dust and contaminants from grill for easy heat radiation. - Remove the dust with vacuum cleaner from the coils condenser while the refrigerator is off.	- The fan may be broken if cleaning performs while the refrigerator is on.

2-4. Cooling

Problems	Causes	Checks	Measures	Remarks
High temperature in the freezer compartment.	Refrigerant leak.	Check sequence 1. Check the welded parts of the drier inlet and outlet and drier auxiliary in the compressor compartment (high pressure side). 2. Check the end of compressor sealing pipe (low pressure side). 3. Check silver soldered parts. (Cu + Fe / Fe + Fe). 4. Check bending area of wire condenser pipe in compressor compartment (cracks can happen during bending). 5. Check other parts (compressor compartment and evaporators in freezer compartment).	Weld the leaking part, recharge the refrigerant.	Drier must be replaced.
	Shortage of refrigerant.	Check frost formation on the surface of evaporator in the freezer compartment. - If the frost forms evenly on the surface, it is OK. - If it does not, it is not good.	- Find out the leaking area, repair, evacuate, and recharge the refrigerant. - No leaking, remove the remaining refrigerant, and recharge new refrigerant.	Drier must be replaced.

Problems	Causes	Checks	Measures	Remarks
High temperature in the freezer compartment.	Cycle pipe is clogged.	Check sequence. 1. Check temperature of condenser manually. If it is warm, it is OK. If it is not, compressor discharging joints might be clogged. 2. Manually check whether hot line pipe is warm. If it is warm, it's OK. If it is not, condenser outlet weld joints might be colgged.	- Heat up compressor discharging weld joints with touch, disconnect the pipes, and check the clogging. Remove the causes of clogging, weld, evacuate, and recharge the refrigerant. - If it's warm, it's OK. If it's not, condenser discharging line weld joints might be clogged. Disconnect with torch, remove the causes, evacuate, and recharge seal refrigerant.	Direr must be replaced.
	Leak at loop pipe weld joint (discharge) in compressor.	Check sequence. 1. Manually check whether condenser is warm, It is not warm and the frost forms partly on the evaporator in the freezer compartment.	Replace the compressor, weld, evacuate, and recharge refrigerant.	Drier must be replaced.
	Faulty cooling fan in the compressor compartment.	Check sequence. 1. Check cooling fan operation. 2. Check that cooling fan is disconnected from the motor.	- Replace if motor does not operate. - If fan is disconnected, check fan damage and reassemble it. ■ Refer to fan motor disassembly and assembly sequence.	

2-5. Defrosting failure

Problems	Causes	Checks	Measures	Remarks
No defrosting.	Heater does not generate heat as the heating wire is cut or the circuit is shorted. 1) Heating wire is damaged when inserting into the evaporator. 2) Lead wire of heater is cut. 3) Heating wire at lead wire contacts is cut.	1. Check the resistance of heater. 0Ω: Short. ∞Ω: Cut. Tens to thousands Ω: OK. 2. Check the resistance between housing terminal and heater surface. 0Ω: Short. ∞Ω: Cut. Tens to thousands Ω: Short.	Heating wire is short and wire is cut. • Parts replacement: Refer to parts explanations.	Seal the lead wire with insulation tape and heat contraction tube if the cut lead wire is accessible to repair.
	Sucking duct and discharging hole are clogged: 1. Impurities. 2. Ice.	1. Confirm foreign materials. In case of ice, insert the copper line through the hole to check. 2. Put hot water into the drain (check drains outside).	1) Push out impurities by inserting copper wire.(Turn off more than 3hours and pour in hot water if frost is severe.) 2) Put in hot water to melt down frost. 3) Check the water outlet. 4) Push the heater plate to sucking duct manually and assemble the disconnected parts.	
	Gap between Sucking duct and Heater plate(Ice in the gap).	1. Confirm in the Sucking duct.	1) Turn off the power, confirm impurities and ice in the gap, and supply hot water until the ice in the gap melts down. 2) Push the Heater plate to drain bottom with hand and assemble the disconnected parts.	
	Wrong heater rating (or wrong assembly).	1. Check heater label. 2. Confirm the capacity after substituting the resistance value into the formula. $P=\frac{V^2}{R}$ (V: Rated voltage of user country) (R: Resistance of tester[Ω]) Compare P and lavel capacity. Tolerance: ±7%	Faults:replace. - How to replace: Refer to main parts.	

Problems	Causes	Checks	Measures	Remarks
No defrosting	Melting fuse blows out. 1) Lead wire is cut. 2) Bad soldering.	- Check melting fuse with tester. - If 0Ω: OK. If ∞Ω: wire is cut.	Faullty parts: parts replacement. - Check wire color when maeasuring resistance with a tester.	
	Ice in the Sucking duct. 1) Icing by foreign materials in the duct. 2) Icing by cool air inflow through the gap of heater plate. 3) Icing by the gap of heater plate.	1. Check the inner duct with mirror. 2. Check by inserting soft copper wire into the duct (soft and thin copper not to impair heating wire).	1) Turn power off. 2) Raise the front side(door side), support the front side legs, and let the ice melt naturally. (If power is on, melt the frost by forced defrosting.) 3) Reassemble the heater plate.	
	Bad cool air inflow and discharge, and bad defrosting due to faulty contact and insertion (bad connector insertion into housing of heater, melting, fuse and motor fan).	1. Turn on power, open or close the door, check that motor fan operates (If it operates, motor fan is OK). 2. Disconnect parts in the refrigerator compartment, check the connection around the housing visually, defrost, and confirm heat generation on the heater. Do not put hands on the sheath heater. 3. Check the parts which have faults described in 1, 2 (mechanical model: disconnect thermostat from the assembly).	1) Check the faulty connector of housing and reassemble wrongly assembled parts. 2) If the parts are very damaged, remove the parts and replace it with a new one.	

2-6. Icing

Problems	Causes	Checks	Measures	Remarks
Icing in the refrigerator compartment. - Damper icing. - Pipe icing. - Discharging pipe icing.	1) Bad circulation of cool air. - Clogged intake port in the refrigerator compartment. - Sealing is not good. - Too much food is stored and clogs the discharge port. - Bad defrosting.	- Check the food is stored properly (check discharge and intake port are clogged). - Check icing on the surface of baffle and cool air path (pipe) after dissembling the container box. - Check icing at intake ports of freezer and refrigerator compartment.	- Be acquainted with how to use. - Sealing on connecting parts. - Check the damper and replace it if it has defects. - Check defrost. (After forced defrosting, check ice in the evaporator and pipes.)	- Check the defrost related parts if problem is caused by faulty defrosting.
	2) Faulty door or refrigerator compartment. - Faulty gasket. - Faulty assembly.	- Check gasket attached conditions. - Check door assembly conditions.	- Correct the gasket attachment conditions and replace it. - Door assembly and replacement.	- Replacement should be done when it cannot be repaired.
	3) Overcooling in the refrigerator compartment. - Faulty damper in the refrigerator compartment. - Faulty MICOM (faulty sensor)	- Check refrigerator compartment is overcooled (when button pressed on "weak"). - Check parts are faulty.	- Replace faulty parts.	
	4) Bad defrosting - Heater wire is cut. - Defective defrost sensor. - Defrosing cycle.	- Check frost on the evaporator after dissembling shroud and fan grille. - Check ice on intake port of freezer and refrigerator compartment.	- Check parts related to defrosting. - Check defrosting. (Check ice on the evaporator and pipe.)	- Moisture cannot frost on the evaporator but can be sucked into the refrigerator, being condensed and iced, interferes with cool air circulation, and suppresses sublimation.
	5) Customers are not familiar with this machine. - Door opens. - High temperature, high moisture, and high load.	- Check food interferes with door closing. - Check ice on the ceilings.	- Be acquainted with how to use.	

Problems	Causes	Checks	Measures	Remarks
Ice in the freezer compartment. - Surface of fan grille. - Wall of freezer compartment. - Cool air discharging port. - Basket(rack) area. - Food surface. - Icing in the shute.	1) Bad cooling air circulation. - Intake port is colgged in the freezer compartment. - Discharging port is Clogged. - Too much food is stored. - Bad defrosting.	- Check food storage conditions visually.(Check clogging at intake and discharging port of cooling air.) - Check food occupation ratio in volume(Less than 75%). - Check frost on the evaporator after dissembling shroud and fan grille. - Check icing at intake port of refrigerator compartment.	- Be acquainted with how to use. - Check defrost (Check ice on the evaporator and pipes after forced defrosting).	- Check the parts related to defrosting if the problem is caused by the faulty defrosting.
	2) Bad freezer compartment door - Faulty gasket - Faulty assembly	- Check gasket attachment conditions. - Check door assembly conditions.	- Correct the gasket attachement conditions and replace it. - Door assembly and replacement.	- Replace when it can not be repaired.
	3) Over freezing in the freezer compartment. - Faulty MICOM.	- Refrigerator operates pull down. (Check if it is operated intermittently) - The Temperature of freezer compartment is satisfactory, but over freezing happens in the refrigerator compartment even though the notch is set at "weak".	-Replace defective parts.	
	4) Bad defrosting. - Heater wire is cut. - Faulty defrost sensor. - Defrosting cycle	- Check frost on the evaporator after dissembling shroud and grille. - Check ice on the intake port in the refrigerator compartment.	- Check parts related to defrosting. - Check defrosting.(Check ice on the evaporator and pipes after forced defrosting.)	
	5) User is not familiar with how to use. - Door opens. - High moisture food(water) is stored.	- Check food holds door open. - Check ice on the ice tray.	- Be acquainted with how to use.	

2-7. Sound

Problems	Causes	Checks	Measures	Remarks
"Whizz" sound	1. Loud sound of compressor operation.	1.1 Check the level of the refrigerator. 1.2 Check the rubber seat conditions (sagging and aging).	1) Maintain horizontal level. 2) Replace rubber and seat if they are sagged and aged. 3) Insert rubber where hand contact reduces noise in the pipe. 4) Avoid pipe interference. 5) Replace defective fan and fan motor. 6) Adjust fan to be in the center of bell mouth of the fan guide. 7) Leve a clearance between interfering parts and seal gaps in the structures. 8) Reassemble the parts which make sound. 9) Leave a clearance if evaporator pipes and suction pipe touch freezer shroud.	
	2. Pipes resonat sound which is connected to the compressor.	2.1 Check the level of pipes connected to the compressor and their interference. 2.2 Check rubber inserting conditions in pipes. 2.3 Touch pipes with hands or screw -driver (check the change of sound).		
	3. Fan operation sound in the freezer compartment.	3.1 Check fan insertion depth and blade damage. 3.2 Check the interference with structures. 3.3 Check fan motor. 3.4 Check fan motor rubber insertion and aging conditions.		
	4. Fan operation sound in the compressor compartment.	4.1 Same as fan confirmation in the refrigerator. 4.2 Check drip tray leg insertion. 4.3 Check the screw fastening conditions at condenser and drip tray.		

Problems	Causes	Checks	Measures	Remarks
Vibration sound. ("Cluck")	1. Vibration of shelves and foods in the refrigerator. 2. Pipes interference and capillary tube touching in the compressor. compartment. 3. Compressor stopper vibration. 4. Moving wheel vibration. 5. Other structure and parts vibration.	1-1. Remove and replace the shelves in the refrigerator 1-2. Check light food and container on the shelves. 2-1. Touch pipes in the compressore compartment with hands. 2-2 Check capillary tube touches cover back. 3-1 Check compressor stopper vibration. 4-1 Check vibration of front and rear moving wheels. 5-1 Touch other structures and parts.	1) Reassemble the vibrating parts and insert foam or cushion where vibration is severe. 2) Leave a clearance where parts interfere with each other. 3) Reduce vibration with rubber and restrainer if it is severe. (especially, compressor and pipe). 4) Replace compressor stopper if it vibtates severely.	
Irregular sound. ("Click").	1. It is caused by heat expansion and contraction of evaporator, shelves, and pipes in the refrigerator.	1-1 Check time and place of sound sources.	1) Explain the principles of refrigeration and that the temperature difference between operation and defrosting can make sounds. 2) If evaporator pipe contacts with other structures, leave a clearance between them (freezer shroud or inner case).	

Problems	Causes	Checks	Measures	Remarks
Sound "Burping" (almost the same as animals crying sound).	It happens when refrigerant expands at the end of capillary tube.	- Check the sound of refrigerant at the initial installation. - Check the sound when the refrigerator starts operation after forced defrosting. - Check the restrainer attachment conditions on the evaporator and capillary tube weld joints.	- Check the restrainer attached on the evaporator and capillary tube weld joints and attach another restrainer. - If it is continuous and servere, insert capillary tube again (depth:15±3mm) - Fasten the capillary tube to suction pipes or detach in the compressor compartment. - Explain the principles of freezing cycles.	
Water boiling or flowing sound.	It happens when refrigerant passes orifice in accumulator internal pipes by the pressure difference between condenser and evaporator.	- Check the sound when compressor is turned on. - Check the sound when compressor is turned off.	- Explain the principles of freezing cycles and refrigerant flowing phenomenon by internal pressure difference. - If sound is servere, wrap the accumulator with foam and restrainer.	
Sound of whistle when door closes.	When door closes, the internal pressure of the refrigerator decreases sharply below atomosphere and sucks air into the refrigerator, making the whistle sound.	- Check the sound by opening and closing the refrigerator or freezer doors.	- Broaden the cap of discharge hose for defrosting in the compressor compartment. - Seal the gap with sealant between out and inner cases of hinge in door.	

2-8. Odor

Problems	Causes	Checks	Measures	Remarks
Food Odor.	Food (garlic, kimchi, etc)	- Check the food is not wrapped. - Check the shelves or inner wall are stained with food juice. - Check the food in the vinyl wraps. - Chedk food cleanliness.	- Dry deodorizer in the shiny and windy place. - Store the food in the closed container instead of vinyl wraps. - Clean the refrigerator and set button at "strong".	
Plastic Odor.	Odors of mixed food and plastic odors.	- Check wet food is wrapped with plastic bowl and bag. - It happens in the new refrigerator.	- Clean the refrigerator. - Persuade customers not to use plastic bag or wraps with wet food or odorous foods.	
Odor from the deodorizer.	Odor from the old deodorizer.	- Check the deodorizer odors.	- Dry the deodorizer with dryer and then in the shiny and windy place. - Remove and replace the deodorants.	*Deodorizer : option

2-9. Micom

Problems	Symptom	Causes		Checks	Measures	Remarks
Bad PCB electric power.	All display LEDS are off.	Bad connection between Main PCB and display circuit.	Bad connector connection from main PCB to display PCB.	Visual check on connector connection.	Reconnect connector.	
		Defective PCB trans.	PCB Trans winding is cut.	Check resistance of PCB Trans input and output terminals with a tester. (If resistance is infinity, trans winding is cut).	Replace PCB Trans or PCB.	Applicable to model without dispenser.
			PCB Trans temperature fuse is burnt out.			
		DefectivePCB electric circuit parts.	Defective regulator IC (7812, 7805).	Check voltage at input/output terminals.	Replace regulator.	Refer to electric circuit in circuit explanation.
			PCB electric terminal fuse is burnt out.	Check fuse in PCB electric terminal with a tester.	Replace PCB fuse.	
			STR Parts are damaged.	Check if STR No. 2 and 3 pins are cut when power is off.	Replace parts.	Applicable to model with dispenser.
	Abnormal display LED operation	Bad connection between Main PCB and display circuit.	Lead Wire connecting main PCB and display PCB is cut or connector terminal connection is bad.	Check Lead Wire terminals connecting Main PCB and display PCB with a tester.	Reconnect Lead Wire and directly connect defective contact terminal to Lead Wire.	
		Defective LED module.	Defective LED.	Check if all LEDs are on when Main PCB Test switch is pressed (or when both freezer key and power freezer key are pressed at the same time for more than one second.)	Replace display PCB.	Refer to display circuit in circuit explanation.

Problems	Symptom	Causes		Checks	Measures	Remarks
Bad cooling.	Freezer temperature is high.	Compressor does not start.	Compressor Lead Wire is cut.	Check compressor Lead Wire with a tester.	Reconnect Lead Wire.	
			Defective compressor driving relay.	Measure voltage at PCB CON5 (3&9) after pressing main PCB test switch once. It is OK if voltage is normal.	Replace relay(RY1 and RY14) or PCB.	Refer to load driving circuit in circuit explanation.
		Defective freezer sensor.	Defective Freezer sensor parts.	Check resistance of freezer sensor with a tester.	Replace freezer sensor.	Refer to resistance characteristics table of sensor in circuit
			Freezer sensor is substituted for other sensor.	Confirm the color of sensor in circuits (main PCB sensor housing).	Repair main PCB sensor housing	explanation.
		Defective freezer fan motor.	Fan motor lead wire is cut.	Check fan motor lead wire with a tester.	Reconnect lead wire.	
			• Defective door switch (freezer, refrigerator, home bar). • Defective fan motor. • Defective fan motor driving relay.	Measure the voltage between PCB power blue line and fan motor after pressing test switch of Main PCB. If the voltage is normal, it is OK.	• Replace door switch (freezer, refrigerator and home bar). • Replace fan motor. • Replace relay(RY5 & RY6) or PCB.	Refer to load driving circuits in circuit explanation.
		Faulty defrost.		Refer to faulty defrost items in trouble diagnosis functions.		Refer to trouble diagnosis function.

Problems	Symptom	Causes		Checks	Measures	Remarks
Bad cooling	Wrong Refrigerator temperature.	Defective AC Damper.	Check AC damper motor and reed switch and lead wire are cut.	Check if AC damper motor and reed switch lead wire are cut with a tester.	Reconnect lead wire.	
			Check AC damper part.	Refer to AC damper in parts repair guide.	Replace AC damper or refrigerator control box Assy.	
			Check AC damper Motor driving relay in PCB.	Refer to AC damper in parts repair guide.	Replace relay or PCB.	Refer to single motor damper driving circuits in circuit explanation.
			Foreign materials in AC damper baffles	Check AC damper baffle visually.	Remove foreign materials.	
			Ice formation on AC damper baffles	Check if AC damper Heater wire is cut with a tester.	Replace AC damper or refrigerator control Box Assy.	
		Defective refrigerator sensor	Defective refrigerator sensor parts.	Check the resistance of refrigerator sensor with a tester.	Replace refrigerator sensor.	Refer to sensor resistance characteristic table in circuit explanation.
			Refrigerator sensor is substituted for other sensor.	Check the sensor color in the circuit. (main PCB sensor housing.)	Repair main PCB sensor housing.	
			Defective refrigerator sensor assembly condition.	Check if refrigerator sensor is not fixed at cover sensor but inner case visually.	Fix again the refrigerator sensor.	

Problems	Symptom	Causes	Checks	Measures	Remarks
Bad defrost.	Defrost is not working.	Defrost lead wire is cut.	Check if defrost lead wire is cut with a tester.	Reconnect Lead Wire.	
		Defective defrost driving relay.	Check the voltage of CON5 (1 and 7) with a tester after pressing main PCB test switch twice. If the voltage is normal then it is OK.	Replace relay (RY 7 and RY 14) or PCB.	Refer to load driving conditions check in circuit explanation.
		Defective defrost sensor parts.	Check the resistance of defrost sensor with a tester.	Replace defrost sensor.	Refer to sensor resistance characteristic table of circuit explanation.
Defective buzzer	Buzzer continuously rings or door opening alarm does not work.	Defective connecting lead wire from main PCB to door switch.	Check lead wire related to door switch with a tester.	Repair lead wire.	
		Defective door switch parts.	Refer to door switch in parts repair guide.	Replace door switch.	
Defective display button	Buzzer does not ring and key does not sense even button is pressed.	Key input wire is cut or bad connector terminal contact in main PCB and display PCB connecting lead wire.	Check input wire with a tester.	Reconnect lead wire and replace or directly connect bad contact terminal to lead wire.	Refer to display circuit in circuit explanation.
		Key is continuously depressed due to structural interference.	Disassemble frame display and confirm visually.	Adjust or replace interfering structures.	

Problems	Symptom	Causes	Checks	Measures	Remarks
Defective display button.	Buzzer rings but key does not sense even button is pressed.	Trouble mode indication.	Check trouble diagnosis function.	Repair troubles	Refer to mode indication in function explanations.
Door Buzzer	Buzzer continuously rings or door opening alarm does not work.	Defective connecting lead wire from main PCB to door switch.	Check lead wire associated with door switch.	Repair lead wire.	Check model with dispenser.
		Defective freezer compartment door switch parts.	Refer to door switch in parts repair guide.	Replace Freezer compartment door switch.	
Bad water/ice dispenser.	Ice and water are not dispensed.	Defective connecting lead wire from Main PCB to lever switch.	Check Lead Wire associated with lever switch with a tester.	Repair lead wire.	
		Defective lever switch parts	Refer to door switch in parts repair guide.	Replace lever switch.	
		Defective photo coupler IC parts.	Check voltage change at photo coupler output terminals with lever switch pressed. It is OK if voltage change is between 0V - 5V.	Replace photo coupler IC or PCB.	
		Defective relay associated with ice dispense (geared motor, cube and dispenser solenoid).	Check relay (RY9, RY11, RY12) with a tester.	Replace defective relay.	
		Defective parts associated with ice dispense (geared motor, cube and dispenser solenoid).	Check resistance of parts with a tester.	Replace defective parts.	
		Defective relay associated with water dispense.	Check relay (RY10) with a tester	Replace defective relay.	
		Defective parts associated with water dispenser.	Check resistance of parts with a tester.	Replace defective parts.	

TROUBLE DIAGNOSIS

3. Cooling Cycle Heavy Repair

3-1. The Heavy Repair Standards for Refrigerator with R134a Refrigerant

NO.	Items		Unit	Standards	Purposes	Remarks
1	Pipe and piping system opening time.		Min.	Pipe:within 1 hour. Comp:within 10 minutes. Drier:within 20 minutes.	To protect Moisture Penetration.	The opening time should be reduced to a half of the standards during rain and rainy seasons (the penetration of water into the pipe is dangerous).
2	Welding.		Nitrogen Pressure.	Weld under Nitrogen atmosphere (N_2 pressure: 0.1~0.2 kg/cm^2)	To protect oxide scale formation.	- Refet to repair note in each part. - R134a refrigerant is more susceptible to leaks than R12 and requires more care during welding. - Do not apply force to pipes before and after welding to protect pipe from cracking.
3	N_2 sealed parts.		Confirm N_2 leak.	Confirm air leaking sounds when removing rubber cap. Sound:usable No sound:not usable	To protect moisture penetration.	- In case of evaporator parts, if it doesn't noise when removing rubber cap blow dry air or N_2 gas for more than 1 min use the parts.
4	Refrigeration Cycle.	Evacuation time	Min.	More than 40 minutes.	To remove moisture.	
		Vacuum degree	Torr	Below 0.03(ref)		Note:Only applicable to the model equipped with reverse flow protect plate.
		Vacuum	EA	High and low Pressure sides are evacuated at the same time for models above 200ℓ		Vaccum efficiency can be improved by operating compressor during evacuation.
		Vacuum piping	EA	Use R134a exclusive manifold.	To protect mixing of mineral and ester oils.	The rubber pipes for R12 refrigerant shall be melted when they are used for R134a refrigerant(causes of leak).
		Pipe coupler	EA	Use R134a cxclusive.	To protect R12 Refrigerant mixing.	
		Outlet (Socket)		R134a exclusive.	〃	
		Plug		R134a exclusive	〃	
5	Refrigerant weighing.		EA	Use R134a exclusively. Weighing allowance:±5g Note:Winter:-5g Summer:+5g	Do not mix with R12 refrigerant.	- Do not weight the refrigerant at too hot or too cold an area.(25°C is adequate.) - Use copper bombe Socket:2SV Plug: 2PV R134a Note:Do not burn O-ring (rubber) during welding.
6	Drier replacement.			-Use R134a exclusively for R134a refrigerator -Use R12 exclusively for R12 refrigerator -Replace drier whenever repairing refrigerator cycle piping.	To remove the moisture from pipe.	
7	Leak check.			-Do not use soapy water for check. it may be sucked into the pipe by.	Detect refrigerant leak area.	-Check oil leak at refrigerant leak area. Use electronic leak detector if oil leak is not found. -The electronic leak detector is very sensitive to halogen gas in the air. It also can detect R141b in urethane. Please practice, therfore, many times before use.

NOTE) Please contact Songso company on +82-53-554-2067 if you have inquiry on heavy repair special facility.

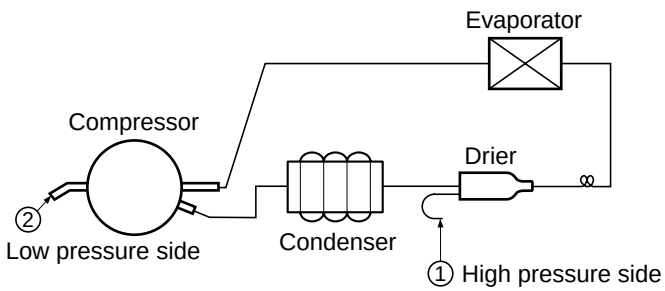
TROUBLE DIAGNOSIS

3-2. Summary Of Heavy Repair

Process	Contents	Tools
Trouble diagnosis		
Remove refrigerant Residuals	- Cut charging pipe ends and discharge refrigerant from drier and compressor.	Filter, side cutters
Parts replacement and welding	- Use R134a oil and refrigerant for compressor and drier - Confirm N_2 sealing and packing conditions before use. Use good one for welding and assembly. - Weld under nitrogen gas atmosphere.(N_2 gas pressure: 0.1-0.2kg/cm^2). - Repair in a clean and dry place.	Pipe Cutter, Gas welder, N_2 gas
Vacuum	- Evacuate for more than forty minutes after connecting manifold gauge hose and vacuum pump to high (drier) and low (compressor refrigerant discharging parts) pressure sides. - Evacuation Speed:113//min.	Vacuum pump(R134a exclusively), Manifold gauge.
Refrigerant charging and charging inlet welding	- Weigh and control the allowance of R134a bombe in a vacuum conditions to be ±5 g with electronic scales and charge through compressor inlet (Charge while refrigerator operates). - Weld carefully after inlet pinching.	R134a exclusive bombe(mass cylinder), refrigerant(R134a) manifold gauge, electronic scales, punching off flier, gas welding machine
Check refrigerant leak and cooling capacity	- Check leak at weld joints. Minute leak: Use electronic leak detector Big leak: Check visually or fingers. Note:Do not use soapy water for check. - Check cooling capacity ① Check radiator manually to see if warm. ② Check hot line pipe manually to see if warm. ③ Check frost formation on the whole surface of the evaporator.	Electronic Leak Detector, Driver(Ruler).
Compressor compartment and tools arrangement	- Remove flux from the silver weld joints with soft brush or wet rag.(Flux may be the cause of corrosion and leaks.) - Clean R134a exclusive tools and store them in a clean tool box or in their place.	Copper brush, Rag, Tool box
Transportation and installation	- Installation should be conducted in accordance with the standard installation procedure.(Leave space of more than 5 cm from the wall for compressor compartment cooling fan mounted model.)	

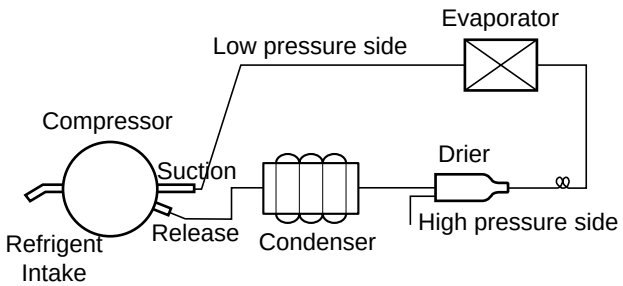
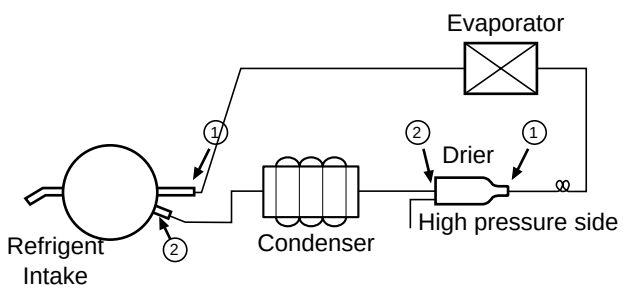
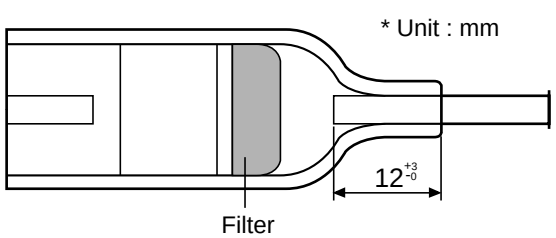
TROUBLE DIAGNOSIS

3-3. Precautions During Heavy Repair

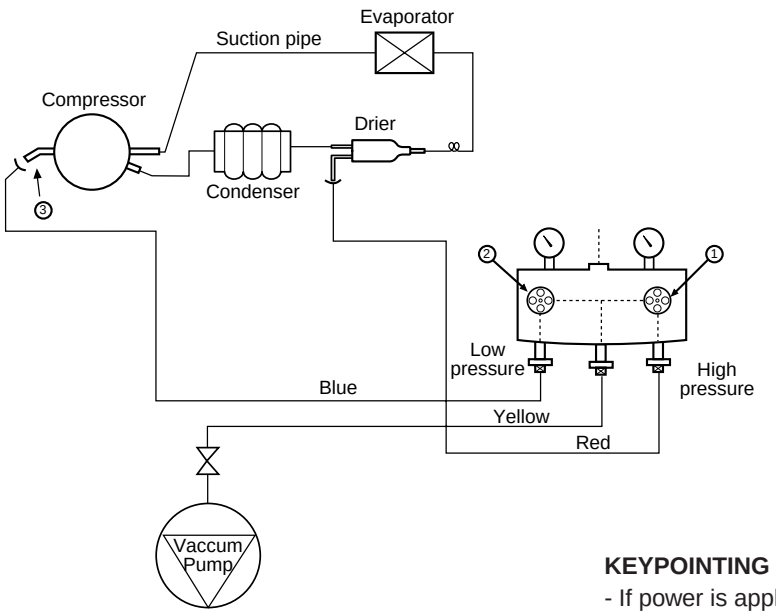
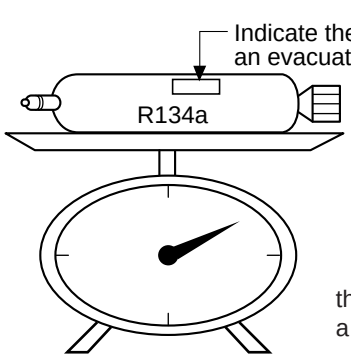
Items	Precautions
1. Use of tools.	1) Use special parts and tools for R134a.
2. Removal of retained refrigerant.	1) Remove retained refrigerant more than 5 minutes after turning off a refrigerator. (If not, oil will leak inside.) 2) Remove retained refrigerant by cutting first high pressure side (drier part) with a nipper and then cut low pressure side. (If the order is not observed, oil leak will happen.) 
3. Replacement of drier.	1) Be sure to replace drier with R134a only when repairing pipes and injecting refrigerant.
4. Nitrogen blowing welding.	1) Weld under nitrogen atmosphere in order to prevent oxidation inside a pipe. (Nitrogen pressure : 0.1~0.2 kg/cm^2.)
5. Others.	1) Nitrogen or refrigerant R134a only should be used when cleaning inside of cycle pipes inside and sealing. 2) Check leakage with an electronic leakage tester. 3) Be sure to use a pipe cutter when cutting pipes. 4) Be careful not the water let intrude into the inside of the cycle.

TROUBLE DIAGNOSIS

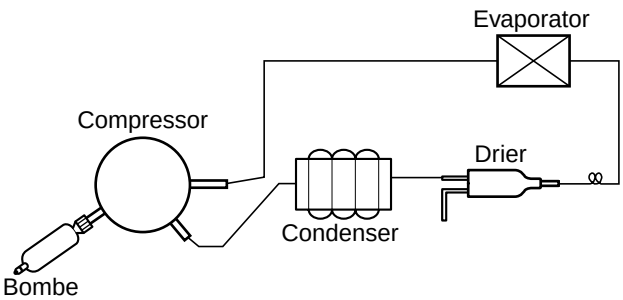
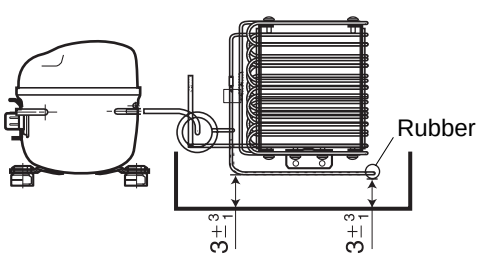
3-4. Practical Work For Heavy Repair

Items	Precautions
1. Removal of residual refrigerant.	 **KEYPOINTING** Observe the sequence for removal of refrigerant. (If not, compressor oil may leak.) 1) Remove residual refrigerant more than 5 minutes later after turning off the refrigerator. (If not, compressor oil may leak inside.) 2) Remove retained refrigerant slowly by cutting first high pressure side (drier part) with a nipper and then cut low pressure side.
2. Nitrogen blowing welding.	 **KEYPOINTING** Welding without nitrogen blowing produces oxidized scales inside a pipe, which affect on performance and reliability of a product. **When replacing a drier:** Weld ① and ② parts by blowing nitrogen(0.1~0.2kg/cm^2) to high pressure side after assembling a drier. **When replacing a compressor:** Weld ① and ② parts by blowing nitrogen to the low pressure side. Note) For other parts, nitrogen blowing is not necessary because it does not produce oxidized scales inside pipe because of its short welding time.
3. Replacement of drier.	 **KEYPOINTING** Be sure to check the inserted length of capillary tube when it is inserted. (If too much inserted, a capillary tube is clogged by a filter.) **Inserting a capillary tube** Measure distance with a ruler and put a mark($12^{+3/-0}$)on the capillary tube. Insert tube to the mark, and weld it

TROUBLE DIAGNOSIS

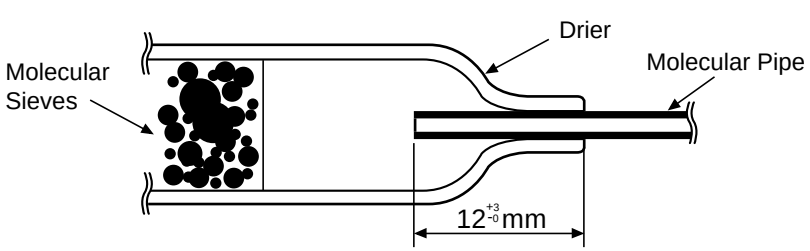
Items	Precautions
4.Vacuum degassing.	 **Pipe Connection** Connect a red hose to the high pressure side and a blue hose to the low pressure side. **Vacuum Sequence** Open ①, ② valves and evacuate for 40 minutes. Close valve ①. **KEYPOINTING** - If power is applied during vacuum degassing, vacuum degassing shall be more effective. - Operate compressor while charging refrigerant. (It is easier and more certain to do like this.)
5.Refrigerant charging.	**Charging sequence** 1) Check the amount of refrigerant supplied to each model after completing vacuum degassing. 2) Evacuate bombe with a vacuum pump. 3) Measure the amount of refrigerant charged. - Measure the weight of an evacuated bombe with an electronic scale. - Charge refrigerant into a bombe and measure the weight. Calculate the weight of refrigerant charged into the bombe by subtracting the weight of an evacuated bombe.  **KEYPOINTING** - Be sure to charge the refrigerant at around 25°C. - Be sure to keep -5g in the winer and +5g in summer **Calculation of amount of refrigerant charged** the amount of refrigerant charged= a weight after charging - a weight before charging (a weight of an evacuated cylinder)

TROUBLE DIAGNOSIS

Items	Precautions
	 4) Refrigerant Charging Charge refrigerant while operating a compressor as shown above. 5) Pinch a charging pipe with a pinch-off plier after completion of charging. 6) Braze the end of a pinched charging pipe with copper brazer and take a gas leakage test on the welded parts.
6. Gas-leakage test	* Take a leakage test on the welded or suspicious area with an electronic leakage tester.
7. Pipe arrangement in each cycle	Check each pipe is placed in its original place before closing a cover back-M/C after completion of work. Particularly control the size of Joint Drain Pipe 

3-5. Standard Regulations For Heavy Repair

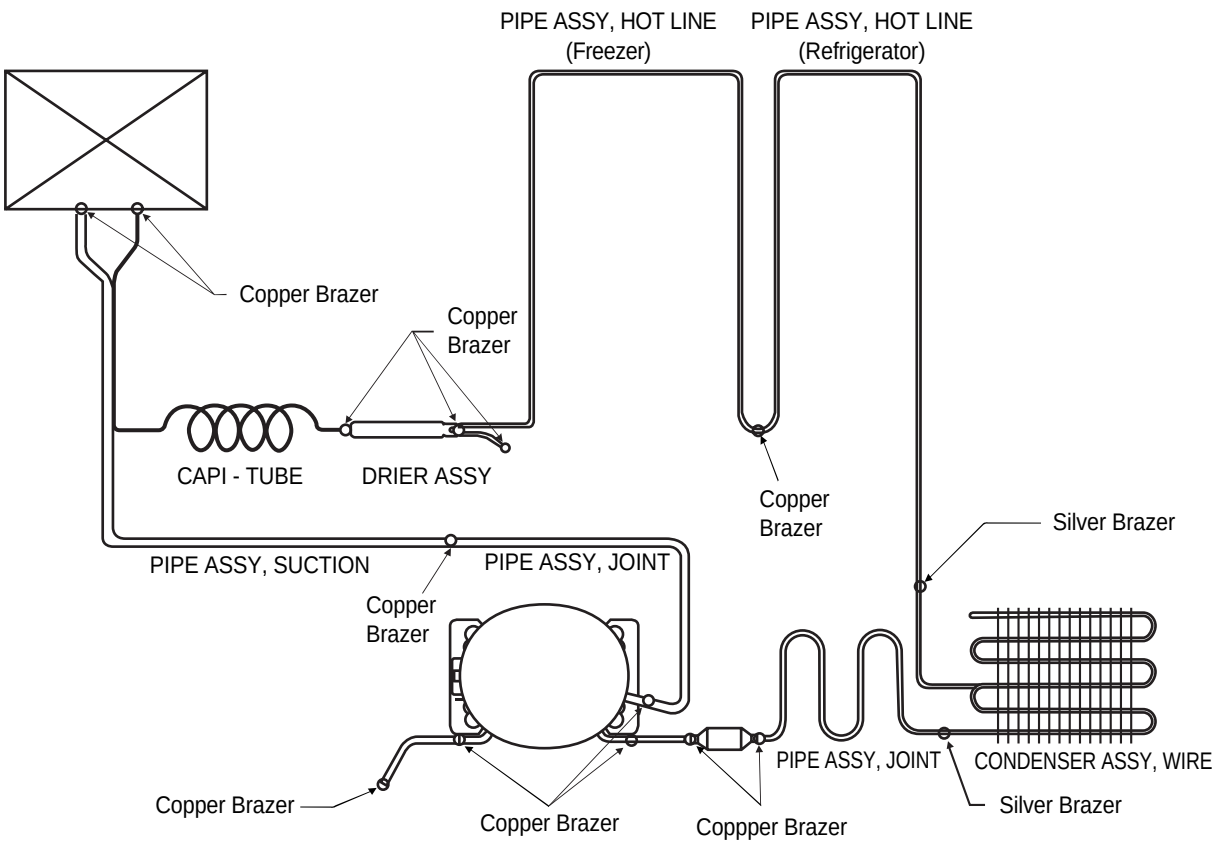
1) Observe the safety precautions for gas handling.
2) Use JIG (or wet towel) in order to prevent electric wires from burning during welding. (In order to prevent insulation break and accident.)
3) The inner case shall be melted and insulation material (polyurethane) shall be burnt if not cared during welding inner case parts.
4) The copper pipe shall be oxidized by overheating if not cared during welding.
5) Not allow the aluminum pipes to contact to copper pipes. (In order to prevent corrosion.)
6) Observe that the inserted length of a capillary tube into a drier should be 12^{+3}_{-0} mm.



7) Make sure that the inner diameter should not be distorted while cutting a capillary tube.
8) Be sure that a suction pipe and a filling tube should not be substituted each other during welding. (High efficiency pump.)

TROUBLE DIAGNOSIS

3-6. Brazing Reference Drawings



TROUBLE DIAGNOSIS

4. HOW TO DEAL WITH CLAIMS

4-1. Sound

Problems	Checks and Measures
"Whizz" sounds	■ **Explain general principles of sounds.** • All refrigerator when functioning properly have normal operating sound. The compressor and fan produce sounds. There is a fan in the freezer compartment which blows cool air to freezer and refrigerator compartments. "Whizz" sounds are heard when the air passes through the narrow holes into the freezer and refrigerator compartments. ■ **Cooling Fan sound in the compressor compartment.** • There is a fan on the back of the refrigerator, which cools the compressor compartment. If there is a small space between the refrigerator and the wall, the air circulation sounds may be noticeable. ■ **Noise of Compressor.** • This operating sound happens when the compressor compresses the refrigerant. The compressor rotates at 3600RPM. The sound of compressor operation becomes louder as the refrigerator capacity increases.
"Click" sounds	■ **Explain the principles of temperature change.** • The sounds happens when pipes and internal evaporator in the refrigerator compartment expand and contract as the temperature changes during the refrigerator operation. This sound also happens during defrosting, twice a day, when the ice on the evaporator melts.
"Clunk" sound	■ **Explain that it comes from the compressor when the refrigerator starts.** • When the refrigerator operates, the piston and motor in the compressor rotate at 3600RPM. This sound is caused by the vibration of motor and piston when they start and finish their operation. This phenomena can be compared with that of cars. When the car engine ignites and starts to rotate, the loud sound becomes gradually quiet. When the engine stops, it stops with vibration.
Vibration sound	■ **Check the sound whether it comes from the pipes vibration and friction.** • Insert rubber or leave a space between pipes to avoid the noise. • Fix the fan blade if the noise is due to the collision of fan and shroud. • Fix the drip tray if it is loosened. ■ **Sound depends on the installation location.** • Sound becomes louder if the refrigerator is installed on a wooden floor or near a wooden wall. Move it to the another location. • If the refrigerator is not leveled properly, a small vibration can make a loud sound. Please adjust the level of the refrigerator.

TROUBLE DIAGNOSIS

Problems	Checks and Measures
Sounds of water flowing	■ **Explain the flow of refrigerant.** • When the refrigerator stops, the water flowing sound happens. This sound happens when the liquid or vapor refrigerant flows from the evaporator to compressor.
"Click" sounds	■ **Explain the characteriistics of moving parts.** • This noise comes from the MICOM controller's switch on the top of the refrigerator when it is turned on and off.
Noise of ice maker operation (applicable to model with ice maker). - Noise produced by ice dropping and hitting ice bank. - Noise from motor sounds “Whizz”.	■ **Explain the procedure and principles of ice maker operation.** • Automatic ice maker repeats the cycle of water supplying → icemaking → ice ejection. When water is supplied, the water supply valve in the machine room makes sounds like “Whizz” and water flowing also makes sound. When water freezes to ice, freezing sounds such as “click, click” are heard. When ice is being ejected, sounds like “Whizz” produced by a motor to rotate an ice tray and ice dropping and hitting ice bank sounds are also heard.
Noise when supplying water.	■ **Explain the principles of water supplied to dispenser.** • When the water supply button in the dispenser is pressed, the water supply valve in the compressor compartment opens and let the water flow to the water tank in the lower part of the refrigerator compartment. The water is dispensed by this pressure. When this happens, motor sound and water flowing sound are heard.
Noise when supplying ice.	■ Explain the principles of ice supply and procedure of crushed ice making in a dispenser. • When ice cube button is pressed, ice stored in the ice bank is moved by a Helix Pusher and dispensed. If crushed ice button is pressed, the cube ice is crushed. When this happens, ice crushing and hitting ice bank sounds are heard.

TROUBLE DIAGNOSIS

4-2. Measures for Symptoms on Temperature

Problems	Checks and Measures
Refrigeration is weak.	■ **Check temperature set in the temperature control knob.** • Refrigerator is generally delivered with the button set at “normal use” (MID). But customer can adjust the temperature set depending on their habit and taste. If you feel the refrigeration is weak, then set the temperature control button at “strong” position. If you adjust the button in the freezer compartment as well, the refrigeration is stronger than adjusting refrigerator only.
The food in the chilled drawer is . not frozen but defrosted	■ **The chilled drawer does not freeze food.** • Use chilled drawer for storing fresh meat or fish for short periods. For storing for a long periods or freezing food, use a freezer compartment. It is normal that frozen foods thaw above the freezing temperature (in the chilled drawer).
Refrigerator water is not cool.	■ **Check the water storage location.** • If water is kept in the door rack, please ask to keep it in the refrigerator compartment shelf. It will then become cooler.
Ice cream softens.	■ **Explain the characteristics of ice cream.** • The freezing point of ice cream is below -15°C. Therefore ice cream may melt if it is stored in the door rack. • Store ice cream in a cold place or set the temperature control button of a freezer at “strong” position.
Refrigeration is too strong.	■ **Check the position of temperature control button.** • Check if refrigeration is strong in whole area of the refrigerator or partly near the outlet of the cooling air. If it is strong in whole area, set the control button at “weak”. If it is strong only near the outlet of cool air, keep food (particularly wet and easy to frozen such as bean curd and vegetables) away from the outlet.
Vegetables are frozen.	■ **Check the vegetables storage.** • If vegetables are stored in the refrigerator shelf or chilled drawer instead of vegetable drawer, they will be frozen. Set the control button at “weak” if they are also frozen in the vegetable drawer.
The food stored at inside of the shelf freezes even the control button is set at “MID”.	■ **Check if food is stored near the outlet of the cooling air.** • The temperature at cooling air outlet is always below the freezing point. Do not store food near the outlet of the cooling air as it block the air circulation. And do not block the outlet. If the outlet of the cooling air is blocked, the refrigerator compartment will not be cooled.

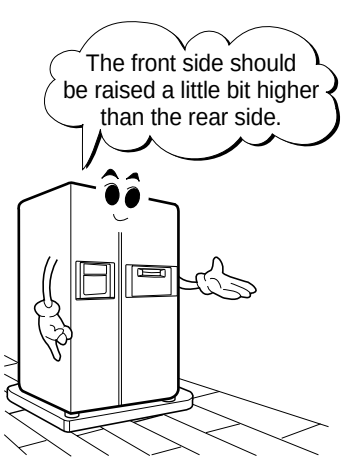
TROUBLE DIAGNOSIS

4-3. Odor and Frost

Problems	Checks and Measures
Odor in the refrigerator compartment.	■ **Explain the basic principles of food odor.** • Each food has its own peculiar odor. Therefore it is impossible to prevent or avoid food odor completely when food is stored in the completely sealed refrigerator compartment. Deodorizer can absorb some portions of the odor but not completely. The intensity of odor depends on refrigerator conditions and environments. ■ **Check the temperature control button and set at "strong".** • Clean inside of the refrigerator with detergent and remove moisture. Dry inside the refrigerator by opening the door for about 3 or 4 hours and then set the temperature control button at "strong".
Frost in the freezer compartment	■ **Explain the basic principles of frost formation.** • The main causes for frosting: - Door was left open. - Air penetration through the gasket - Too frequent door opening. (parties. etc.) - Hot foods are stored before they are cooled down. The temperature of freezer is -19°C. if temperature is set at "MID". If hot air comes into the refrigerator, fine frost forms as cold air mixes with hot air. If this happens quite often, much frost forms inside of the refrigerator. If the door is left open in Summer, ice may form inside of the refrigerator.
Frost in ice tray.	■ **Explain basic principles of frost formation.** • When ice tray with full of water is put into a freezer compartment, the water evaporates. If cool air fan operates, the moisture attached to the jaw (protruded part) of ice mold shall freeze and form frost. If warm water was put into the ice mold, the situation will become worse.

TROUBLE DIAGNOSIS

4-5. Others

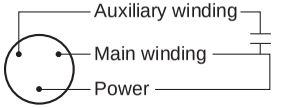
Problems	Checks and Measures
The refrigerator case is hot.	■ Explain the principles of radiator. • The radiator pipes are installed in the refrigerator case and partition plate between the refrigerator and the freezer compartment in order to prevent condensation formation. Particularly in summer or after installation of refrigerator, it may feel hot but it is normal. If there is no enough space to dissipate heat, it can be hotter due to lack of heat radiation. Please install a refrigerator in a well-ventilated place and leave a clearance between refrigerator and wall:
Small holes in a door liner	■ Explain that the hole is for releasing gas. • A small hole in the door liner is for releasing gas during insulation materials lining work. With a releasing hole, forming can be easily done .
Electric bills are too much.	■ Check the use conditions. • Too frequent door opening and hot food storing cause the compressor to operate continuously and hence increase the electric consumption and bills.
Condensation on the inside wall of the refrigerator compartment and the cover of properly vegetable drawer.	■ Explain how to store foods • Condensation forms when refrigerator is installed at damp area, door is frequently opened, and wet foods are not stored in the air tight container or wrapped. Be sure to store wet foods in the air tight container or in the wrap.
When is the power connected?	■ When should the power be connected ? • You can connect the power right after the installation. But if the refrigerator was laid flat during transportation for a long period of time and the refrigerant and compressor oils are mixed up, then this will affect badly the performance of a refrigerator. Be sure to connect the power 2~3 hours after refrigerator is installed.
Door does not open properly.  	■ Refrigerator compartment door does not open properly. • When the door is open, warm open air comes into the compartment and is mixed up with cool air. This mixed air shall be compressed and increase the internal pressure when door is closed. This causes the door sticked closely to the refrigerator in a moment. (If the refrigerator is used for a long time, it will then open smoothly.) ■ When the refrigerator compartment door is open and close, the freezer compartment door moves up and down. • When the refrigerator compartment door is open and close, fresh air comes into the freezer compartment and moves up and down the freezer compartment door. ■ Door opens too easily. • There is a magnet in the gasket rubber so that it is ok. if door is securely closed without a gap. It can be open easily if the foods in the refrigerator or freezer compartments hold the door open. ■ A door does not close properly. • If the rear side of the refrigerator is raised higher than front side, door shall not be easily closed. Adjust the level of refrigerator with levelling screws.

2. Faults

2-1. Power

Problems	Causes	Checks	Measures	Remarks
No power on outlet.	- Power cord cut. - Faulty connector insertion. - Faulty connection between plug and adapter.	- Check the voltage with tester. - Check visually. - Check visually.	-Replace the components. -Reconnect the connecting parts. - Reconnect the connecting parts.	
Fuse blows out.	- Short circuit by wrong connection. - Low voltage products are connected to high voltage. - Short circuit by insects. - Electricity leakage. - High voltage. - Short circuit of components (tracking due to moisture and dust penetration).	- Check the fuse with tester or visually. - Check the input volt are with tester (between power cord and products). - Check the resistance of power cord with testerf (if it is 0Ω, it is shorted).	- Find and remove the cause of problem(ex. short, high voltage, low voltage). - Replace with rated fuse.	- Replace with rated fuse after confirming its specification. ■ If fuse blowns out frequently, reconfirm the cause and prevent.

2-2. Compressor

Problems	Causes	Checks	Measures	Remarks
Compressor does not operate.	- Faulty PTC.	- Check the resistance. Vlaue:∞ is defective.	- If resistance is infinite, replace it with new one. - If it is not infinite, it is normal. - Check other parts.	
	- Compressor is frozen.	- If compressor assembly parts are normal(capacitor, PTC, OLP), apply power directly to the compressor to force operation.  OLP It starts as soon as it is contacted.	- During forced operation: - Operates: Check other parts. - Not operate: Replace the frozen compressor with new one, weld, evacuate, and recharge refrigerant. • Refer to weld repair procedures.	

2-3. Temperature

Problems	Causes	Checks	Measures	Remarks
High temperature in the freezer compartment.	Poor cool air circulation due to faulty fan motor.	- Lock — Check resistance with a tester. 0Ω: short. ∞Ω: cut. - Rotate rotor manually and check rotation. - Wire is cut. - Bad terminal contact: Check terminal visually. - Fan constraint. – Fan shroud contact: Confirm visually. – Fan icing: Confirm visually.	- Replace fan motor. - Reconnect and reinsert. - Maintain clearance and remove ice (Repair and/or replace shroud if fan is constrained by shroud deformation).	
	Faulty fan motor due to faulty door switch operation.	- Iced button (faulty) operation: Press button to check - Faulty button pressure and contact: Press button to check operation. - Door cannot press door switch button: Check visually.	- Confirm icing causes and repair. - Replace door switch. - Door sag: fix door. - Door liner bent:replace door or attach sheets.	
	Bad radiation conditions in compressor compartment.	- Check the clearance between the refrigerator and wall (50 mm in minimum). - Check dust on the grill in compressor compartment. - Check dust on the coils condenser.	- Keep clearance between refrigerator and walls (minimum 50mm). - Remove dust and contaminants from grill for easy heat radiation. - Remove the dust with vacuum cleaner from the coils condenser while the refrigerator is off.	- The fan may be broken if cleaning performs while the refrigerator is on.

2-4. Cooling

Problems	Causes	Checks	Measures	Remarks
High temperature in the freezer compartment.	Refrigerant leak.	Check sequence 1. Check the welded parts of the drier inlet and outlet and drier auxiliary in the compressor compartment (high pressure side). 2. Check the end of compressor sealing pipe (low pressure side). 3. Check silver soldered parts. (Cu + Fe / Fe + Fe). 4. Check bending area of wire condenser pipe in compressor compartment (cracks can happen during bending). 5. Check other parts (compressor compartment and evaporators in freezer compartment).	Weld the leaking part, recharge the refrigerant.	Drier must be replaced.
	Shortage of refrigerant.	Check frost formation on the surface of evaporator in the freezer compartment. - If the frost forms evenly on the surface, it is OK. - If it does not, it is not good.	- Find out the leaking area, repair, evacuate, and recharge the refrigerant. - No leaking, remove the remaining refrigerant, and recharge new refrigerant.	Drier must be replaced.

Problems	Causes	Checks	Measures	Remarks
High temperature in the freezer compartment.	Cycle pipe is clogged.	Check sequence. 1. Check temperature of condenser manually. If it is warm, it is OK. If it is not, compressor discharging joints might be clogged. 2. Manually check whether hot line pipe is warm. If it is warm, it's OK. If it is not, condenser outlet weld joints might be colgged.	- Heat up compressor discharging weld joints with touch, disconnect the pipes, and check the clogging. Remove the causes of clogging, weld, evacuate, and recharge the refrigerant. - If it's warm, it's OK. If it's not, condenser discharging line weld joints might be clogged. Disconnect with torch, remove the causes, evacuate, and recharge seal refrigerant.	Direr must be replaced.
	Leak at loop pipe weld joint (discharge) in compressor.	Check sequence. 1. Manually check whether condenser is warm, It is not warm and the frost forms partly on the evaporator in the freezer compartment.	Replace the compressor, weld, evacuate, and recharge refrigerant.	Drier must be replaced.
	Faulty cooling fan in the compressor compartment.	Check sequence. 1. Check cooling fan operation. 2. Check that cooling fan is disconnected from the motor.	- Replace if motor does not operate. - If fan is disconnected, check fan damage and reassemble it. ■ Refer to fan motor disassembly and assembly sequence.	

2-5. Defrosting failure

Problems	Causes	Checks	Measures	Remarks
No defrosting.	Heater does not generate heat as the heating wire is cut or the circuit is shorted. 1) Heating wire is damaged when inserting into the evaporator. 2) Lead wire of heater is cut. 3) Heating wire at lead wire contacts is cut.	1. Check the resistance of heater. 0Ω: Short. ∞Ω: Cut. Tens to thousands Ω: OK. 2. Check the resistance between housing terminal and heater surface. 0Ω: Short. ∞Ω: Cut. Tens to thousands Ω: Short.	Heating wire is short and wire is cut. • Parts replacement: Refer to parts explanations.	Seal the lead wire with insulation tape and heat contraction tube if the cut lead wire is accessible to repair.
	Sucking duct and discharging hole are clogged: 1. Impurities. 2. Ice.	1. Confirm foreign materials. In case of ice, insert the copper line through the hole to check. 2. Put hot water into the drain (check drains outside).	1) Push out impurities by inserting copper wire.(Turn off more than 3hours and pour in hot water if frost is severe.) 2) Put in hot water to melt down frost. 3) Check the water outlet. 4) Push the heater plate to sucking duct manually and assemble the disconnected parts.	
	Gap between Sucking duct and Heater plate(Ice in the gap).	1. Confirm in the Sucking duct.	1) Turn off the power, confirm impurities and ice in the gap, and supply hot water until the ice in the gap melts down. 2) Push the Heater plate to drain bottom with hand and assemble the disconnected parts.	
	Wrong heater rating (or wrong assembly).	1. Check heater label. 2. Confirm the capacity after substituting the resistance value into the formula. $P=\frac{V^2}{R}$ (V: Rated voltage of user country) (R: Resistance of tester[Ω]) Compare P and lavel capacity. Tolerance: ±7%	Faults:replace. - How to replace: Refer to main parts.	

Problems	Causes	Checks	Measures	Remarks
No defrosting	Melting fuse blows out. 1) Lead wire is cut. 2) Bad soldering.	- Check melting fuse with tester. - If 0Ω: OK. If ∞Ω: wire is cut.	Faullty parts: parts replacement. - Check wire color when maeasuring resistance with a tester.	
	Ice in the Sucking duct. 1) Icing by foreign materials in the duct. 2) Icing by cool air inflow through the gap of heater plate. 3) Icing by the gap of heater plate.	1. Check the inner duct with mirror. 2. Check by inserting soft copper wire into the duct (soft and thin copper not to impair heating wire).	1) Turn power off. 2) Raise the front side(door side), support the front side legs, and let the ice melt naturally. (If power is on, melt the frost by forced defrosting.) 3) Reassemble the heater plate.	
	Bad cool air inflow and discharge, and bad defrosting due to faulty contact and insertion (bad connector insertion into housing of heater, melting, fuse and motor fan).	1. Turn on power, open or close the door, check that motor fan operates (If it operates, motor fan is OK). 2. Disconnect parts in the refrigerator compartment, check the connection around the housing visually, defrost, and confirm heat generation on the heater. Do not put hands on the sheath heater. 3. Check the parts which have faults described in 1, 2 (mechanical model: disconnect thermostat from the assembly).	1) Check the faulty connector of housing and reassemble wrongly assembled parts. 2) If the parts are very damaged, remove the parts and replace it with a new one.	

2-6. Icing

Problems	Causes	Checks	Measures	Remarks
Icing in the refrigerator compartment. - Damper icing. - Pipe icing. - Discharging pipe icing.	1) Bad circulation of cool air. - Clogged intake port in the refrigerator compartment. - Sealing is not good. - Too much food is stored and clogs the discharge port. - Bad defrosting.	- Check the food is stored properly (check discharge and intake port are clogged). - Check icing on the surface of baffle and cool air path (pipe) after dissembling the container box. - Check icing at intake ports of freezer and refrigerator compartment.	- Be acquainted with how to use. - Sealing on connecting parts. - Check the damper and replace it if it has defects. - Check defrost. (After forced defrosting, check ice in the evaporator and pipes.)	- Check the defrost related parts if problem is caused by faulty defrosting.
	2) Faulty door or refrigerator compartment. - Faulty gasket. - Faulty assembly.	- Check gasket attached conditions. - Check door assembly conditions.	- Correct the gasket attachment conditions and replace it. - Door assembly and replacement.	- Replacement should be done when it cannot be repaired.
	3) Overcooling in the refrigerator compartment. - Faulty damper in the refrigerator compartment. - Faulty MICOM (faulty sensor)	- Check refrigerator compartment is overcooled (when button pressed on "weak"). - Check parts are faulty.	- Replace faulty parts.	
	4) Bad defrosting - Heater wire is cut. - Defective defrost sensor. - Defrosing cycle.	- Check frost on the evaporator after dissembling shroud and fan grille. - Check ice on intake port of freezer and refrigerator compartment.	- Check parts related to defrosting. - Check defrosting. (Check ice on the evaporator and pipe.)	- Moisture cannot frost on the evaporator but can be sucked into the refrigerator, being condensed and iced, interferes with cool air circulation, and suppresses sublimation.
	5) Customers are not familiar with this machine. - Door opens. - High temperature, high moisture, and high load.	- Check food interferes with door closing. - Check ice on the ceilings.	- Be acquainted with how to use.	

Problems	Causes	Checks	Measures	Remarks
Ice in the freezer compartment. - Surface of fan grille. - Wall of freezer compartment. - Cool air discharging port. - Basket(rack) area. - Food surface. - Icing in the shute.	1) Bad cooling air circulation. - Intake port is colgged in the freezer compartment. - Discharging port is Clogged. - Too much food is stored. - Bad defrosting.	- Check food storage conditions visually.(Check clogging at intake and discharging port of cooling air.) - Check food occupation ratio in volume(Less than 75%). - Check frost on the evaporator after dissembling shroud and fan grille. - Check icing at intake port of refrigerator compartment.	- Be acquainted with how to use. - Check defrost (Check ice on the evaporator and pipes after forced defrosting).	- Check the parts related to defrosting if the problem is caused by the faulty defrosting.
	2) Bad freezer compartment door - Faulty gasket - Faulty assembly	- Check gasket attachment conditions. - Check door assembly conditions.	- Correct the gasket attachement conditions and replace it. - Door assembly and replacement.	- Replace when it can not be repaired.
	3) Over freezing in the freezer compartment. - Faulty MICOM.	- Refrigerator operates pull down. (Check if it is operated intermittently) - The Temperature of freezer compartment is satisfactory, but over freezing happens in the refrigerator compartment even though the notch is set at "weak".	-Replace defective parts.	
	4) Bad defrosting. - Heater wire is cut. - Faulty defrost sensor. - Defrosting cycle	- Check frost on the evaporator after dissembling shroud and grille. - Check ice on the intake port in the refrigerator compartment.	- Check parts related to defrosting. - Check defrosting.(Check ice on the evaporator and pipes after forced defrosting.)	
	5) User is not familiar with how to use. - Door opens. - High moisture food(water) is stored.	- Check food holds door open. - Check ice on the ice tray.	- Be acquainted with how to use.	

2-7. Sound

Problems	Causes	Checks	Measures	Remarks
"Whizz" sound	1. Loud sound of compressor operation.	1.1 Check the level of the refrigerator. 1.2 Check the rubber seat conditions (sagging and aging).	1) Maintain horizontal level. 2) Replace rubber and seat if they are sagged and aged. 3) Insert rubber where hand contact reduces noise in the pipe. 4) Avoid pipe interference. 5) Replace defective fan and fan motor. 6) Adjust fan to be in the center of bell mouth of the fan guide. 7) Leve a clearance between interfering parts and seal gaps in the structures. 8) Reassemble the parts which make sound. 9) Leave a clearance if evaporator pipes and suction pipe touch freezer shroud.	
	2. Pipes resonat sound which is connected to the compressor.	2.1 Check the level of pipes connected to the compressor and their interference. 2.2 Check rubber inserting conditions in pipes. 2.3 Touch pipes with hands or screw -driver (check the change of sound).		
	3. Fan operation sound in the freezer compartment.	3.1 Check fan insertion depth and blade damage. 3.2 Check the interference with structures. 3.3 Check fan motor. 3.4 Check fan motor rubber insertion and aging conditions.		
	4. Fan operation sound in the compressor compartment.	4.1 Same as fan confirmation in the refrigerator. 4.2 Check drip tray leg insertion. 4.3 Check the screw fastening conditions at condenser and drip tray.		

Problems	Causes	Checks	Measures	Remarks
Vibration sound. ("Cluck")	1. Vibration of shelves and foods in the refrigerator. 2. Pipes interference and capillary tube touching in the compressor. compartment. 3. Compressor stopper vibration. 4. Moving wheel vibration. 5. Other structure and parts vibration.	1-1. Remove and replace the shelves in the refrigerator 1-2. Check light food and container on the shelves. 2-1. Touch pipes in the compressore compartment with hands. 2-2 Check capillary tube touches cover back. 3-1 Check compressor stopper vibration. 4-1 Check vibration of front and rear moving wheels. 5-1 Touch other structures and parts.	1) Reassemble the vibrating parts and insert foam or cushion where vibration is severe. 2) Leave a clearance where parts interfere with each other. 3) Reduce vibration with rubber and restrainer if it is severe. (especially, compressor and pipe). 4) Replace compressor stopper if it vibtates severely.	
Irregular sound. ("Click").	1. It is caused by heat expansion and contraction of evaporator, shelves, and pipes in the refrigerator.	1-1 Check time and place of sound sources.	1) Explain the principles of refrigeration and that the temperature difference between operation and defrosting can make sounds. 2) If evaporator pipe contacts with other structures, leave a clearance between them (freezer shroud or inner case).	

Problems	Causes	Checks	Measures	Remarks
Sound "Burping" (almost the same as animals crying sound).	It happens when refrigerant expands at the end of capillary tube.	- Check the sound of refrigerant at the initial installation. - Check the sound when the refrigerator starts operation after forced defrosting. - Check the restrainer attachment conditions on the evaporator and capillary tube weld joints.	- Check the restrainer attached on the evaporator and capillary tube weld joints and attach another restrainer. - If it is continuous and servere, insert capillary tube again (depth:15±3mm) - Fasten the capillary tube to suction pipes or detach in the compressor compartment. - Explain the principles of freezing cycles.	
Water boiling or flowing sound.	It happens when refrigerant passes orifice in accumulator internal pipes by the pressure difference between condenser and evaporator.	- Check the sound when compressor is turned on. - Check the sound when compressor is turned off.	- Explain the principles of freezing cycles and refrigerant flowing phenomenon by internal pressure difference. - If sound is servere, wrap the accumulator with foam and restrainer.	
Sound of whistle when door closes.	When door closes, the internal pressure of the refrigerator decreases sharply below atomosphere and sucks air into the refrigerator, making the whistle sound.	- Check the sound by opening and closing the refrigerator or freezer doors.	- Broaden the cap of discharge hose for defrosting in the compressor compartment. - Seal the gap with sealant between out and inner cases of hinge in door.	

2-8. Odor

Problems	Causes	Checks	Measures	Remarks
Food Odor.	Food (garlic, kimchi, etc)	- Check the food is not wrapped. - Check the shelves or inner wall are stained with food juice. - Check the food in the vinyl wraps. - Chedk food cleanliness.	- Dry deodorizer in the shiny and windy place. - Store the food in the closed container instead of vinyl wraps. - Clean the refrigerator and set button at "strong".	
Plastic Odor.	Odors of mixed food and plastic odors.	- Check wet food is wrapped with plastic bowl and bag. - It happens in the new refrigerator.	- Clean the refrigerator. - Persuade customers not to use plastic bag or wraps with wet food or odorous foods.	
Odor from the deodorizer.	Odor from the old deodorizer.	- Check the deodorizer odors.	- Dry the deodorizer with dryer and then in the shiny and windy place. - Remove and replace the deodorants.	*Deodorizer : option

2-9. Micom

Problems	Symptom	Causes		Checks	Measures	Remarks
Bad PCB electric power.	All display LEDS are off.	Bad connection between Main PCB and display circuit.	Bad connector connection from main PCB to display PCB.	Visual check on connector connection.	Reconnect connector.	
		Defective PCB trans.	PCB Trans winding is cut.	Check resistance of PCB Trans input and output terminals with a tester. (If resistance is infinity, trans winding is cut).	Replace PCB Trans or PCB.	Applicable to model without dispenser.
			PCB Trans temperature fuse is burnt out.			
		DefectivePCB electric circuit parts.	Defective regulator IC (7812, 7805).	Check voltage at input/output terminals.	Replace regulator.	Refer to electric circuit in circuit explanation.
			PCB electric terminal fuse is burnt out.	Check fuse in PCB electric terminal with a tester.	Replace PCB fuse.	
			STR Parts are damaged.	Check if STR No. 2 and 3 pins are cut when power is off.	Replace parts.	Applicable to model with dispenser.
	Abnormal display LED operation	Bad connection between Main PCB and display circuit.	Lead Wire connecting main PCB and display PCB is cut or connector terminal connection is bad.	Check Lead Wire terminals connecting Main PCB and display PCB with a tester.	Reconnect Lead Wire and directly connect defective contact terminal to Lead Wire.	
		Defective LED module.	Defective LED.	Check if all LEDs are on when Main PCB Test switch is pressed (or when both freezer key and power freezer key are pressed at the same time for more than one second.)	Replace display PCB.	Refer to display circuit in circuit explanation.

Problems	Symptom	Causes		Checks	Measures	Remarks
Bad cooling.	Freezer temperature is high.	Compressor does not start.	Compressor Lead Wire is cut.	Check compressor Lead Wire with a tester.	Reconnect Lead Wire.	
			Defective compressor driving relay.	Measure voltage at PCB CON5 (3&9) after pressing main PCB test switch once. It is OK if voltage is normal.	Replace relay(RY1 and RY14) or PCB.	Refer to load driving circuit in circuit explanation.
		Defective freezer sensor.	Defective Freezer sensor parts.	Check resistance of freezer sensor with a tester.	Replace freezer sensor.	Refer to resistance characteristics table of sensor in circuit
			Freezer sensor is substituted for other sensor.	Confirm the color of sensor in circuits (main PCB sensor housing).	Repair main PCB sensor housing	explanation.
		Defective freezer fan motor.	Fan motor lead wire is cut.	Check fan motor lead wire with a tester.	Reconnect lead wire.	
			• Defective door switch (freezer, refrigerator, home bar). • Defective fan motor. • Defective fan motor driving relay.	Measure the voltage between PCB power blue line and fan motor after pressing test switch of Main PCB. If the voltage is normal, it is OK.	• Replace door switch (freezer, refrigerator and home bar). • Replace fan motor. • Replace relay(RY5 & RY6) or PCB.	Refer to load driving circuits in circuit explanation.
		Faulty defrost.		Refer to faulty defrost items in trouble diagnosis functions.		Refer to trouble diagnosis function.

Problems	Symptom	Causes		Checks	Measures	Remarks
Bad cooling	Wrong Refrigerator temperature.	Defective AC Damper.	Check AC damper motor and reed switch and lead wire are cut.	Check if AC damper motor and reed switch lead wire are cut with a tester.	Reconnect lead wire.	
			Check AC damper part.	Refer to AC damper in parts repair guide.	Replace AC damper or refrigerator control box Assy.	
			Check AC damper Motor driving relay in PCB.	Refer to AC damper in parts repair guide.	Replace relay or PCB.	Refer to single motor damper driving circuits in circuit explanation.
			Foreign materials in AC damper baffles	Check AC damper baffle visually.	Remove foreign materials.	
			Ice formation on AC damper baffles	Check if AC damper Heater wire is cut with a tester.	Replace AC damper or refrigerator control Box Assy.	
		Defective refrigerator sensor	Defective refrigerator sensor parts.	Check the resistance of refrigerator sensor with a tester.	Replace refrigerator sensor.	Refer to sensor resistance characteristic table in circuit explanation.
			Refrigerator sensor is substituted for other sensor.	Check the sensor color in the circuit. (main PCB sensor housing.)	Repair main PCB sensor housing.	
			Defective refrigerator sensor assembly condition.	Check if refrigerator sensor is not fixed at cover sensor but inner case visually.	Fix again the refrigerator sensor.	

Problems	Symptom	Causes	Checks	Measures	Remarks
Bad defrost.	Defrost is not working.	Defrost lead wire is cut.	Check if defrost lead wire is cut with a tester.	Reconnect Lead Wire.	
		Defective defrost driving relay.	Check the voltage of CON5 (1 and 7) with a tester after pressing main PCB test switch twice. If the voltage is normal then it is OK.	Replace relay (RY 7 and RY 14) or PCB.	Refer to load driving conditions check in circuit explanation.
		Defective defrost sensor parts.	Check the resistance of defrost sensor with a tester.	Replace defrost sensor.	Refer to sensor resistance characteristic table of circuit explanation.
Defective buzzer	Buzzer continuously rings or door opening alarm does not work.	Defective connecting lead wire from main PCB to door switch.	Check lead wire related to door switch with a tester.	Repair lead wire.	
		Defective door switch parts.	Refer to door switch in parts repair guide.	Replace door switch.	
Defective display button	Buzzer does not ring and key does not sense even button is pressed.	Key input wire is cut or bad connector terminal contact in main PCB and display PCB connecting lead wire.	Check input wire with a tester.	Reconnect lead wire and replace or directly connect bad contact terminal to lead wire.	Refer to display circuit in circuit explanation.
		Key is continuously depressed due to structural interference.	Disassemble frame display and confirm visually.	Adjust or replace interfering structures.	

Problems	Symptom	Causes	Checks	Measures	Remarks
Defective display button.	Buzzer rings but key does not sense even button is pressed.	Trouble mode indication.	Check trouble diagnosis function.	Repair troubles	Refer to mode indication in function explanations.
Door Buzzer	Buzzer continuously rings or door opening alarm does not work.	Defective connecting lead wire from main PCB to door switch.	Check lead wire associated with door switch.	Repair lead wire.	Check model with dispenser.
		Defective freezer compartment door switch parts.	Refer to door switch in parts repair guide.	Replace Freezer compartment door switch.	
Bad water/ice dispenser.	Ice and water are not dispensed.	Defective connecting lead wire from Main PCB to lever switch.	Check Lead Wire associated with lever switch with a tester.	Repair lead wire.	
		Defective lever switch parts	Refer to door switch in parts repair guide.	Replace lever switch.	
		Defective photo coupler IC parts.	Check voltage change at photo coupler output terminals with lever switch pressed. It is OK if voltage change is between 0V - 5V.	Replace photo coupler IC or PCB.	
		Defective relay associated with ice dispense (geared motor, cube and dispenser solenoid).	Check relay (RY9, RY11, RY12) with a tester.	Replace defective relay.	
		Defective parts associated with ice dispense (geared motor, cube and dispenser solenoid).	Check resistance of parts with a tester.	Replace defective parts.	
		Defective relay associated with water dispense.	Check relay (RY10) with a tester	Replace defective relay.	
		Defective parts associated with water dispenser.	Check resistance of parts with a tester.	Replace defective parts.	

2-3. Temperature

Problems	Causes	Checks	Measures	Remarks
High temperature in the freezer compartment.	Poor cool air circulation due to faulty fan motor.	- Lock — Check resistance with a tester. 0Ω: short. ∞Ω: cut. - Rotate rotor manually and check rotation. - Wire is cut. - Bad terminal contact: Check terminal visually. - Fan constraint. – Fan shroud contact: Confirm visually. – Fan icing: Confirm visually.	- Replace fan motor. - Reconnect and reinsert. - Maintain clearance and remove ice (Repair and/or replace shroud if fan is constrained by shroud deformation).	
	Faulty fan motor due to faulty door switch operation.	- Iced button (faulty) operation: Press button to check - Faulty button pressure and contact: Press button to check operation. - Door cannot press door switch button: Check visually.	- Confirm icing causes and repair. - Replace door switch. - Door sag: fix door. - Door liner bent:replace door or attach sheets.	
	Bad radiation conditions in compressor compartment.	- Check the clearance between the refrigerator and wall (50 mm in minimum). - Check dust on the grill in compressor compartment. - Check dust on the coils condenser.	- Keep clearance between refrigerator and walls (minimum 50mm). - Remove dust and contaminants from grill for easy heat radiation. - Remove the dust with vacuum cleaner from the coils condenser while the refrigerator is off.	- The fan may be broken if cleaning performs while the refrigerator is on.

2-4. Cooling

Problems	Causes	Checks	Measures	Remarks
High temperature in the freezer compartment.	Refrigerant leak.	Check sequence 1. Check the welded parts of the drier inlet and outlet and drier auxiliary in the compressor compartment (high pressure side). 2. Check the end of compressor sealing pipe (low pressure side). 3. Check silver soldered parts. (Cu + Fe / Fe + Fe). 4. Check bending area of wire condenser pipe in compressor compartment (cracks can happen during bending). 5. Check other parts (compressor compartment and evaporators in freezer compartment).	Weld the leaking part, recharge the refrigerant.	Drier must be replaced.
	Shortage of refrigerant.	Check frost formation on the surface of evaporator in the freezer compartment. - If the frost forms evenly on the surface, it is OK. - If it does not, it is not good.	- Find out the leaking area, repair, evacuate, and recharge the refrigerant. - No leaking, remove the remaining refrigerant, and recharge new refrigerant.	Drier must be replaced.

Problems	Causes	Checks	Measures	Remarks
High temperature in the freezer compartment.	Cycle pipe is clogged.	Check sequence. 1. Check temperature of condenser manually. If it is warm, it is OK. If it is not, compressor discharging joints might be clogged. 2. Manually check whether hot line pipe is warm. If it is warm, it's OK. If it is not, condenser outlet weld joints might be colgged.	- Heat up compressor discharging weld joints with touch, disconnect the pipes, and check the clogging. Remove the causes of clogging, weld, evacuate, and recharge the refrigerant. - If it's warm, it's OK. If it's not, condenser discharging line weld joints might be clogged. Disconnect with torch, remove the causes, evacuate, and recharge seal refrigerant.	Direr must be replaced.
	Leak at loop pipe weld joint (discharge) in compressor.	Check sequence. 1. Manually check whether condenser is warm, It is not warm and the frost forms partly on the evaporator in the freezer compartment.	Replace the compressor, weld, evacuate, and recharge refrigerant.	Drier must be replaced.
	Faulty cooling fan in the compressor compartment.	Check sequence. 1. Check cooling fan operation. 2. Check that cooling fan is disconnected from the motor.	- Replace if motor does not operate. - If fan is disconnected, check fan damage and reassemble it. ■ Refer to fan motor disassembly and assembly sequence.	

2-5. Defrosting failure

Problems	Causes	Checks	Measures	Remarks
No defrosting.	Heater does not generate heat as the heating wire is cut or the circuit is shorted. 1) Heating wire is damaged when inserting into the evaporator. 2) Lead wire of heater is cut. 3) Heating wire at lead wire contacts is cut.	1. Check the resistance of heater. 0Ω: Short. ∞Ω: Cut. Tens to thousands Ω: OK. 2. Check the resistance between housing terminal and heater surface. 0Ω: Short. ∞Ω: Cut. Tens to thousands Ω: Short.	Heating wire is short and wire is cut. • Parts replacement: Refer to parts explanations.	Seal the lead wire with insulation tape and heat contraction tube if the cut lead wire is accessible to repair.
	Sucking duct and discharging hole are clogged: 1. Impurities. 2. Ice.	1. Confirm foreign materials. In case of ice, insert the copper line through the hole to check. 2. Put hot water into the drain (check drains outside).	1) Push out impurities by inserting copper wire.(Turn off more than 3hours and pour in hot water if frost is severe.) 2) Put in hot water to melt down frost. 3) Check the water outlet. 4) Push the heater plate to sucking duct manually and assemble the disconnected parts.	
	Gap between Sucking duct and Heater plate(Ice in the gap).	1. Confirm in the Sucking duct.	1) Turn off the power, confirm impurities and ice in the gap, and supply hot water until the ice in the gap melts down. 2) Push the Heater plate to drain bottom with hand and assemble the disconnected parts.	
	Wrong heater rating (or wrong assembly).	1. Check heater label. 2. Confirm the capacity after substituting the resistance value into the formula. $P=\frac{V^2}{R}$ (V: Rated voltage of user country) (R: Resistance of tester[Ω]) Compare P and lavel capacity. Tolerance: ±7%	Faults:replace. - How to replace: Refer to main parts.	

Problems	Causes	Checks	Measures	Remarks
No defrosting	Melting fuse blows out. 1) Lead wire is cut. 2) Bad soldering.	- Check melting fuse with tester. - If 0Ω: OK. If ∞Ω: wire is cut.	Faullty parts: parts replacement. - Check wire color when maeasuring resistance with a tester.	
	Ice in the Sucking duct. 1) Icing by foreign materials in the duct. 2) Icing by cool air inflow through the gap of heater plate. 3) Icing by the gap of heater plate.	1. Check the inner duct with mirror. 2. Check by inserting soft copper wire into the duct (soft and thin copper not to impair heating wire).	1) Turn power off. 2) Raise the front side(door side), support the front side legs, and let the ice melt naturally. (If power is on, melt the frost by forced defrosting.) 3) Reassemble the heater plate.	
	Bad cool air inflow and discharge, and bad defrosting due to faulty contact and insertion (bad connector insertion into housing of heater, melting, fuse and motor fan).	1. Turn on power, open or close the door, check that motor fan operates (If it operates, motor fan is OK). 2. Disconnect parts in the refrigerator compartment, check the connection around the housing visually, defrost, and confirm heat generation on the heater. Do not put hands on the sheath heater. 3. Check the parts which have faults described in 1, 2 (mechanical model: disconnect thermostat from the assembly).	1) Check the faulty connector of housing and reassemble wrongly assembled parts. 2) If the parts are very damaged, remove the parts and replace it with a new one.	

2-6. Icing

Problems	Causes	Checks	Measures	Remarks
Icing in the refrigerator compartment. - Damper icing. - Pipe icing. - Discharging pipe icing.	1) Bad circulation of cool air. - Clogged intake port in the refrigerator compartment. - Sealing is not good. - Too much food is stored and clogs the discharge port. - Bad defrosting.	- Check the food is stored properly (check discharge and intake port are clogged). - Check icing on the surface of baffle and cool air path (pipe) after dissembling the container box. - Check icing at intake ports of freezer and refrigerator compartment.	- Be acquainted with how to use. - Sealing on connecting parts. - Check the damper and replace it if it has defects. - Check defrost. (After forced defrosting, check ice in the evaporator and pipes.)	- Check the defrost related parts if problem is caused by faulty defrosting.
	2) Faulty door or refrigerator compartment. - Faulty gasket. - Faulty assembly.	- Check gasket attached conditions. - Check door assembly conditions.	- Correct the gasket attachment conditions and replace it. - Door assembly and replacement.	- Replacement should be done when it cannot be repaired.
	3) Overcooling in the refrigerator compartment. - Faulty damper in the refrigerator compartment. - Faulty MICOM (faulty sensor)	- Check refrigerator compartment is overcooled (when button pressed on "weak"). - Check parts are faulty.	- Replace faulty parts.	
	4) Bad defrosting - Heater wire is cut. - Defective defrost sensor. - Defrosing cycle.	- Check frost on the evaporator after dissembling shroud and fan grille. - Check ice on intake port of freezer and refrigerator compartment.	- Check parts related to defrosting. - Check defrosting. (Check ice on the evaporator and pipe.)	- Moisture cannot frost on the evaporator but can be sucked into the refrigerator, being condensed and iced, interferes with cool air circulation, and suppresses sublimation.
	5) Customers are not familiar with this machine. - Door opens. - High temperature, high moisture, and high load.	- Check food interferes with door closing. - Check ice on the ceilings.	- Be acquainted with how to use.	

Problems	Causes	Checks	Measures	Remarks
Ice in the freezer compartment. - Surface of fan grille. - Wall of freezer compartment. - Cool air discharging port. - Basket(rack) area. - Food surface. - Icing in the shute.	1) Bad cooling air circulation. - Intake port is colgged in the freezer compartment. - Discharging port is Clogged. - Too much food is stored. - Bad defrosting.	- Check food storage conditions visually.(Check clogging at intake and discharging port of cooling air.) - Check food occupation ratio in volume(Less than 75%). - Check frost on the evaporator after dissembling shroud and fan grille. - Check icing at intake port of refrigerator compartment.	- Be acquainted with how to use. - Check defrost (Check ice on the evaporator and pipes after forced defrosting).	- Check the parts related to defrosting if the problem is caused by the faulty defrosting.
	2) Bad freezer compartment door - Faulty gasket - Faulty assembly	- Check gasket attachment conditions. - Check door assembly conditions.	- Correct the gasket attachement conditions and replace it. - Door assembly and replacement.	- Replace when it can not be repaired.
	3) Over freezing in the freezer compartment. - Faulty MICOM.	- Refrigerator operates pull down. (Check if it is operated intermittently) - The Temperature of freezer compartment is satisfactory, but over freezing happens in the refrigerator compartment even though the notch is set at "weak".	-Replace defective parts.	
	4) Bad defrosting. - Heater wire is cut. - Faulty defrost sensor. - Defrosting cycle	- Check frost on the evaporator after dissembling shroud and grille. - Check ice on the intake port in the refrigerator compartment.	- Check parts related to defrosting. - Check defrosting.(Check ice on the evaporator and pipes after forced defrosting.)	
	5) User is not familiar with how to use. - Door opens. - High moisture food(water) is stored.	- Check food holds door open. - Check ice on the ice tray.	- Be acquainted with how to use.	

2-7. Sound

Problems	Causes	Checks	Measures	Remarks
"Whizz" sound	1. Loud sound of compressor operation.	1.1 Check the level of the refrigerator. 1.2 Check the rubber seat conditions (sagging and aging).	1) Maintain horizontal level. 2) Replace rubber and seat if they are sagged and aged. 3) Insert rubber where hand contact reduces noise in the pipe. 4) Avoid pipe interference. 5) Replace defective fan and fan motor. 6) Adjust fan to be in the center of bell mouth of the fan guide. 7) Leve a clearance between interfering parts and seal gaps in the structures. 8) Reassemble the parts which make sound. 9) Leave a clearance if evaporator pipes and suction pipe touch freezer shroud.	
	2. Pipes resonat sound which is connected to the compressor.	2.1 Check the level of pipes connected to the compressor and their interference. 2.2 Check rubber inserting conditions in pipes. 2.3 Touch pipes with hands or screw -driver (check the change of sound).		
	3. Fan operation sound in the freezer compartment.	3.1 Check fan insertion depth and blade damage. 3.2 Check the interference with structures. 3.3 Check fan motor. 3.4 Check fan motor rubber insertion and aging conditions.		
	4. Fan operation sound in the compressor compartment.	4.1 Same as fan confirmation in the refrigerator. 4.2 Check drip tray leg insertion. 4.3 Check the screw fastening conditions at condenser and drip tray.		

Problems	Causes	Checks	Measures	Remarks
Vibration sound. ("Cluck")	1. Vibration of shelves and foods in the refrigerator. 2. Pipes interference and capillary tube touching in the compressor. compartment. 3. Compressor stopper vibration. 4. Moving wheel vibration. 5. Other structure and parts vibration.	1-1. Remove and replace the shelves in the refrigerator 1-2. Check light food and container on the shelves. 2-1. Touch pipes in the compressore compartment with hands. 2-2 Check capillary tube touches cover back. 3-1 Check compressor stopper vibration. 4-1 Check vibration of front and rear moving wheels. 5-1 Touch other structures and parts.	1) Reassemble the vibrating parts and insert foam or cushion where vibration is severe. 2) Leave a clearance where parts interfere with each other. 3) Reduce vibration with rubber and restrainer if it is severe. (especially, compressor and pipe). 4) Replace compressor stopper if it vibtates severely.	
Irregular sound. ("Click").	1. It is caused by heat expansion and contraction of evaporator, shelves, and pipes in the refrigerator.	1-1 Check time and place of sound sources.	1) Explain the principles of refrigeration and that the temperature difference between operation and defrosting can make sounds. 2) If evaporator pipe contacts with other structures, leave a clearance between them (freezer shroud or inner case).	

Problems	Causes	Checks	Measures	Remarks
Sound "Burping" (almost the same as animals crying sound).	It happens when refrigerant expands at the end of capillary tube.	- Check the sound of refrigerant at the initial installation. - Check the sound when the refrigerator starts operation after forced defrosting. - Check the restrainer attachment conditions on the evaporator and capillary tube weld joints.	- Check the restrainer attached on the evaporator and capillary tube weld joints and attach another restrainer. - If it is continuous and servere, insert capillary tube again (depth:15±3mm) - Fasten the capillary tube to suction pipes or detach in the compressor compartment. - Explain the principles of freezing cycles.	
Water boiling or flowing sound.	It happens when refrigerant passes orifice in accumulator internal pipes by the pressure difference between condenser and evaporator.	- Check the sound when compressor is turned on. - Check the sound when compressor is turned off.	- Explain the principles of freezing cycles and refrigerant flowing phenomenon by internal pressure difference. - If sound is servere, wrap the accumulator with foam and restrainer.	
Sound of whistle when door closes.	When door closes, the internal pressure of the refrigerator decreases sharply below atomosphere and sucks air into the refrigerator, making the whistle sound.	- Check the sound by opening and closing the refrigerator or freezer doors.	- Broaden the cap of discharge hose for defrosting in the compressor compartment. - Seal the gap with sealant between out and inner cases of hinge in door.	

Loc No.	Part No	Description	Code	Origin	Model No.
101A	3650JA3032R	Handle,Rear	R	KR	GR-L207ER
101A	3650JA3032R	Handle,Rear	R	MM	GR-L207ER
101B	3650JA3032Q	Handle,Rear	R	KR	GR-L207ER
101B	3650JA3032Q	Handle,Rear	R	MM	GR-L207ER
103A	4779JA3001B	LEG ASSEMBLY,ADJUST	R	KR	GR-L207ER
104A	5251JA3004A	Tube Assembly,Drain	R	MM	GR-L207ER
104A	5251JA3004A	Tube Assembly,Drain	R	KR	GR-L207ER
105B	3550JA0024B	Cover,Lower	R	KR	GR-L207ER
105C	5070JA3002F	SKIRT,LOWER	R	KR	GR-L207ER
105C	5070JA3002F	Skirt,Lower	R	WR	GR-L207ER
105D	5070JA3002G	Skirt,Lower	R	KR	GR-L207ER
105D	5070JA3002G	Skirt,Lower	R	WR	GR-L207ER
105E	5070JA3002J	SKIRT,LOWER	R	KR	GR-L207ER
105E	5070JA3002J	Skirt,Lower	R	WR	GR-L207ER
105F	5070JA3002E	Skirt,Lower	R	KR	GR-L207ER
105F	5070JA3002E	Skirt,Lower	R	WR	GR-L207ER
115A	4995JA1021C	CONTROL BOX ASSY,R	R	KR	GR-L207ER
115A	4995JA1021K	CONTROL BOX ASSY,R		KR	GR-L207ER
115B	4994JD1036B	CONTROL BOX,R	R	KR	GR-L207ER
116a	5209JA1011B	DUCT ASSY,INSULATION	R	KR	GR-L207ER
120A	5027JA2041B	Shelf Assembly,Freezer	R	KR	GR-L207ER
120B	5027JA2036F	Shelf Assembly,Freezer	R	KR	GR-L207ER
125A	3391JA1038A	Tray Assembly,Drawer	R	KR	GR-L207ER
125A	3391JA2018D	Tray Assembly,Drawer		KR	GR-L207ER
128c	4974JA1043A	Guide,Rail	R	KR	GR-L207ER
128d	4974JA1043B	Guide,Rail	R	KR	GR-L207ER
130A	3550JA1113A	Cover,Lamp	R	KR	GR-L207ER
135A	3531JA2013B	Grille Assembly,Fan	R	KR	GR-L207ER
135B	3531JA2015B	GRILLE ASSY,FAN	R	KR	GR-L207ER
136A	5901JA1008A	Fan Assembly	R	KR	GR-L207ER
136B	4810JA3026A	Bracket,Motor	R	KR	GR-L207ER
136C	J756-00008A	Damper,Motor Support	R	KR	GR-L207ER
136C	J756-00008A	Damper,Motor Support	R	KR	GR-L207ER
137A	4999JA2010B	Shroud Assembly,Freezer	R	KR	GR-L207ER
140A	5027JA1013C	Shelf Assembly,Refrigerator	R	KR	GR-L207ER
140C	5026JA2027A	Shelf,Net	R	KR	GR-L207ER
140D	5026JA2027B	Shelf,Net	R	KR	GR-L207ER
141A	5027JA1013D	Shelf Assembly,Refrigerator	R	KR	GR-L207ER
141C	5026JA2027D	Shelf,Net	R	KR	GR-L207ER
141D	5026JA2027C	Shelf,Net	R	KR	GR-L207ER
146A	J469-00030A	Rack	R	KR	GR-L207ER
147A	5074JA1008A	Bucket,Dairy	R	KR	GR-L207ER
151E	3550JA2106A	COVER,DUCT	R	KR	GR-L207ER
152a	3550JA2035D	Cover,Sensor	R	KR	GR-L207ER
152a	3550JA2035D	Cover,Sensor	R	MM	GR-L207ER
155A	3111JA2007B	Case Assembly,Dispenser	R	KR	GR-L207ER
160A	3391JA1033B	Tray Assembly,Vegetable	R	KR	GR-L207ER
160B	3806JD1021A	Decor,Tray	R	KR	GR-L207ER
160B	3806JD1021A	Decor,Tray	R	KR	GR-L207ER

160D	4940JA2008A	Knob,Shutter	R	KR	GR-L207ER
160c	3390JD1047C	Tray,Vegetable	R	KR	GR-L207ER
160d	4940JA2008A	Knob,Shutter	R	KR	GR-L207ER
161A	3550JA2101A	Cover,Tray	R	KR	GR-L207ER
162A	4975JA2012A	Guide Assembly,Rail	R	KR	GR-L207ER
162B	4975JA2012B	Guide Assembly,Rail	R	KR	GR-L207ER
165C	3390JD1048B	Tray,Vegetable	R	KR	GR-L207ER
165a	3391JA1035B	Tray Assembly,Vegetable	R	KR	GR-L207ER
166A	3551JA1026B	COVER ASSY,TRAY	R	KR	GR-L207ER
166B	4986JA3005B	Gasket,Cover Tray	R	KR	GR-L207ER
166B	4986JA3005B	Gasket,Cover Tray	R	WR	GR-L207ER
170A	3391JA1034B	Tray Assembly,Snack	R	KR	GR-L207ER
170B	3806JA1027A	Decor,Tray	R	KR	GR-L207ER
170B	3806JA3022A	DECO,TRAY	R	KR	GR-L207ER
170C	3390JD1049B	Tray,Snack	R	KR	GR-L207ER
171a	4975JA1012C	Guide Assembly,Rail	R	KR	GR-L207ER
171b	4975JA1012D	Guide Assembly,Rail	R	KR	GR-L207ER
177a	4975JA2003A	Guide Assembly,Rail	R	KR	GR-L207ER
177b	4975JA2003N	Guide Assembly,Rail	R	KR	GR-L207ER
200A	3581JA0013Q	DOOR ASSEMBLY,F	R	KR	GR-L207ER
201A	5433JA0043Q	DOOR FOAM ASSEMBLY,F	R	KR	GR-L207ER
202A	4987JA1022D	GASKET ASSY,DOOR	R	KR	GR-L207ER
203A	4621JA3002A	STOPPER ASSY,DOOR	R	KR	GR-L207ER
205A	3650JA2017B	HANDLE,DECO	R	KR	GR-L207ER
205A	3650JA2017B	HANDLE,DECO	R	KR	GR-L207ER
205B	3650JA2016B	HANDLE,DECO	R	KR	GR-L207ER
205B	3650JA2016B	HANDLE,DECO	R	KR	GR-L207ER
205C	3650JA3037A	HANDLE,PIECE	R	KR	GR-L207ER
205C	3650JA3037A	HANDLE,PIECE	R	KR	GR-L207ER
205D	3651JA2152B	HANDLE ASSY	R	KR	GR-L207ER
205D	3651JA2152B	HANDLE ASSY	R	KR	GR-L207ER
207A	3211JA1007B	FRAME ASSY,DISPLAY	R	KR	GR-L207ER
210A	5004JD1101G	Basket,Door	R	KR	GR-L207ER
210B	5004JD1101D	Basket,Door	R	KR	GR-L207ER
210C	5004JD1101X	Basket,Door	R	KR	GR-L207ER
230A	3581JA0014K	DOOR ASSEMBLY,F	R	KR	GR-L207ER
231A	5433JA0044K	DOOR FOAM ASSEMBLY,F	R	KR	GR-L207ER
233A	4621JA3002B	STOPPER ASSY,DOOR	R	KR	GR-L207ER
234A	4140JD1016C	NAME PLATE,P(H)	R	KR	GR-L207ER
240A	5004JD1101E	Basket,Door	R	KR	GR-L207ER
240C	5004JD1101F	Basket,Door	R	KR	GR-L207ER
241A	3550JA1104B	Cover,Tray	R	KR	GR-L207ER
241B	5004JD1101A	Basket,Door	R	KR	GR-L207ER
243A	4974JA2026A	Guide,Pitcher	R	KR	GR-L207ER
270A	3550JA1108D	Cover,Hinge	R	KR	GR-L207ER
270B	3550JA1108C	Cover,Hinge	R	KR	GR-L207ER
271A	4775JA2024A	Hinge Assembly,Upper	R	KR	GR-L207ER
271B	4510JA3004A	Lever,Hinge	R	MM	GR-L207ER
271B	4510JA3004A	Lever,Hinge	R	KR	GR-L207ER
272A	4775JA2017E	HINGE ASSEMBLY,L	R	KR	GR-L207ER
272B	4775JA2017F	HINGE ASSEMBLY,L	R	KR	GR-L207ER
275A	5007JA3006F	CAP ASSY,DUCT	R	KR	GR-L207ER
275B	5006JA2012B	CAP,DUCT	R	KR	GR-L207ER

275C	5040JA3032B	RUBBER,CAP	R	KR	GR-L207ER
275D	4510JA2006A	LEVER,DISPENSER	R	KR	GR-L207ER
276A	4970JA3011A	Spring,Lever	R	KR	GR-L207ER
276A	4970JA3011A	Spring,Lever	R	WR	GR-L207ER
276A	4970JA3011A	SPRING,LEVER	R	MM	GR-L207ER
276A	4970JA3011A	Spring,Lever	R	TR	GR-L207ER
276B	4930JA3043A	Holder,Lever	R	KR	GR-L207ER
276B	4930JA3043A	Holder,Lever	R	MM	GR-L207ER
276B	4930JA3043A	Holder,Lever	R	TR	GR-L207ER
277A	3550JA2067A	Cover,Tray	R	KR	GR-L207ER
278A	3017JA2001E	Funnel Assembly	R	KR	GR-L207ER
278B	3210JA1011B	Frame,Funnel	R	KR	GR-L207ER
278C	4510JA3007A	Lever,Ice Maker	R	KR	GR-L207ER
278D	4980JA2024B	Funnel	R	KR	GR-L207ER
278E	5040JA2006B	RUBBER,FUNNEL	R	KR	GR-L207ER
278F	6600JB3002A	Switch,Rocker	R	KR	GR-L207ER
278F	6600JB3002A	Switch,Rocker	R	KR	GR-L207ER
279A	3550JD1020A	COVER,DISPENSER	R	KR	GR-L207ER
280A	3807JA3006D	Button Assembly	R	KR	GR-L207ER
280B	5040JA2008B	Button,Lever	R	KR	GR-L207ER
280C	3806JA2019B	Holder,Button	R	KR	GR-L207ER
281A	3806JA2022B	Decor,Drain	R	KR	GR-L207ER
300A	2521C-A9501	RE-COMPRESSOR,SET ASSY		KR	GR-L207ER
300A	2521C-BA101	RE-COMPRESSOR,ASSY	R	KR	GR-L207ER
301A	5403JA1024A	Condenser Assembly,Wire	R	MM	GR-L207ER
301A	5403JA1024A	Condenser Assembly,Wire	R	KR	GR-L207ER
301A	5403JA1024A	Condenser Assembly,Wire	R	TR	GR-L207ER
302A	5421JA1132C	EVAPORATOR ASSEMBLY	R	KR	GR-L207ER
303A	6749JA2003H	Thermistor Assembly,PTC	R	KR	GR-L207ER
303A	6749JA2003R	Thermistor Assembly,PTC		KR	GR-L207ER
303A	6749JA2003R	Thermistor Assembly,PTC		WR	GR-L207ER
303B	6748C-0002A	Thermistor,PTC	R	KR	GR-L207ER
303B	6748C-0002A	Thermistor,PTC	R	TR	GR-L207ER
303C	6750C-0004V	Overload Protect	R	KR	GR-L207ER
303C	6750C-0004V	Overload Protect	R	TR	GR-L207ER
303D	6877JB2040D	Drawing,Assembly	R	KR	GR-L207ER
304A	3550JA2042A	Cover,PTC	R	KR	GR-L207ER
304A	3550JA2042A	Cover,PTC	R	MM	GR-L207ER
305A	3103JA1014B	Base Assembly,Compressor	R	KR	GR-L207ER
305B	4580JA3021A	Roller	R	KR	GR-L207ER
305C	1PZZJA3003A	Pin,Common	R	KR	GR-L207ER
306A	5040JA3031A	Damper,Compressor	R	KR	GR-L207ER
306A	5040JA3031A	DAMPER,COMPRESSOR	R	MM	GR-L207ER
306C	4J03020A	Damper,Pipe	R	KR	GR-L207ER
306C	4J03020A	Damper,Pipe	R	IN	GR-L207ER
306C	4J03020A	DAMPER,PIPE	R	MM	GR-L207ER
306D	4J04328A	DAMPER,PIPE	R	KR	GR-L207ER
306D	4J04328A	DAMPER,PIPE	R	IN	GR-L207ER
306D	4J04328A	DAMPER,PIPE	R	MM	GR-L207ER
307A	4J03277A	Stopper,Compressor	R	KR	GR-L207ER
307A	4J03277A	Stopper,Compressor	R	TR	GR-L207ER
307A	4J03277A	Stopper,Compressor	R	MM	GR-L207ER
307A	4J03277A	Stopper,Compressor	R	IN	GR-L207ER

307A	4J03277A	Stopper,Compressor	R	WR	GR-L207ER
307A	4J03277A	Stopper,Compressor	R	IL	GR-L207ER
308A	3390JA1109A	Tray,Drip	R	KR	GR-L207ER
308B	4974JA1044A	Guide,Fan	R	MM	GR-L207ER
308B	4974JA1044A	Guide,Fan	R	KR	GR-L207ER
308C	3550JA2069A	Cover,Motor	R	KR	GR-L207ER
308C	3550JA2069A	Cover,Motor	R	MM	GR-L207ER
309A	5901JA1002A	Fan Assembly	R	KR	GR-L207ER
310A	5200JA1011A	PIPE,JOINT	R	KR	GR-L207ER
310B	4J00977P	PIPE,COMP SEALING	R	KR	GR-L207ER
310B	4J00977P	Pipe,Compressor Sealing	R	IN	GR-L207ER
310B	5200JA1009B	Pipe,Joint	R	KR	GR-L207ER
312A	3391JA2016B	Tray Assembly,Drain	R	KR	GR-L207ER
313A	3551JA1024A	Cover Assembly,Machinery(Rear)	R	KR	GR-L207ER
317A	5851JA2003A	DRIER	R	KR	GR-L207ER
317B	4930JA3034A	Holder,Drier	R	MM	GR-L207ER
317B	4930JA3034A	Holder,Drier	R	KR	GR-L207ER
317B	4930JA3034A	HOLDER,DRIER	R	TR	GR-L207ER
320A	4827JA3002B	SPACER ASSY	R	KR	GR-L207ER
320B	4826JA3008B	SPACER	R	KR	GR-L207ER
320C	4826JA3008C	SPACER	R	KR	GR-L207ER
400A	6615JB2002G	CONTROLLER ASSEMBLY(CIRC)	R	KR	GR-L207ER
401A	6912JB2004E	LAMP,[INCANDESCENT]	R	KR	GR-L207ER
401A	6912JB2004E	LAMP,INCANDESCENT	R	MM	GR-L207ER
401C	6912JB2002F	Lamp,Incandescent	R	KR	GR-L207ER
401C	6912JB2002F	Lamp,Incandescent	R	IN	GR-L207ER
401C	6912JB2002F	Lamp,Incandescent	R	TR	GR-L207ER
401C	6912JB2002F	Lamp,Incandescent	R	WR	GR-L207ER
402A	6600JB1004A	Switch,Push Button	R	KR	GR-L207ER
402A	6600JB1004A	SWITCH,[PUSH]	R	IL	GR-L207ER
402A	6600JB1004A	Switch,Push Button	R	WR	GR-L207ER
402A	6600JB1004A	Switch,Push Button	R	TR	GR-L207ER
402A	6600JB1004A	Switch,Push Button	R	MM	GR-L207ER
402A	6600JB1010A	Switch,Push Button		KR	GR-L207ER
402C	6600JB3001A	SWITCH,MICRO	R	KR	GR-L207ER
402C	6600JB3001E	Switch,Micro		KR	GR-L207ER
402C	6600JB3001E	Switch,Micro		WR	GR-L207ER
402C	6600JB3001E	Switch,Micro		TR	GR-L207ER
403A	4680JB1024M	MOTOR(MECH),FAN	R	KR	GR-L207ER
403B	4680JB1026B	Motor,AC	R	KR	GR-L207ER
404A	6877JB3019A	CONNECTOR ASSEMBLY	R	KR	GR-L207ER
404B	6877JB2074A	Drawing,Assembly	R	KR	GR-L207ER
404B	6877JB3015A	Drawing,Assembly	R	KR	GR-L207ER
405A	6421JB2002B	Solenoid Assembly	R	KR	GR-L207ER
405A	6421JB2002B	Solenoid Assembly	R	WR	GR-L207ER
405A	6421JB2002B	Solenoid Assembly	R	TR	GR-L207ER
406A	6411JB1008A	Power Cord Assembly	R	KR	GR-L207ER
407A	0CZZJB2002A	Capacitor,Film,Box	R	TR	GR-L207ER
407A	0CZZJB2002A	Capacitor,Film,Box	R	KR	GR-L207ER
407B	0CZZJB2003C	Capacitor,Electric Appliance Film,Ra	R	IN	GR-L207ER
407B	0CZZJB2003C	Capacitor,Electric Appliance Film,Ra	R	KR	GR-L207ER
407B	0CZZJB2003C	CAPACITOR,DRAWING	R	TR	GR-L207ER
408A	5300JB1054B	HEATER,SHEATH	R	KR	GR-L207ER

408B	5300JB1065B	HEATER,CORD-L	R	KR	GR-L207ER
410A	6620JB1001F	SOCKET (CIRC),[LAMP]	R	KR	GR-L207ER
500A	6871JB1064V	PWB(PCB) ASSEMBLY,MAIN	R	KR	GR-L207ER
501A	6871JB2022A	PCB Assembly,Display	R	KR	GR-L207ER
502A	3550JA1068C	COVER,PWB	R	KR	GR-L207ER
502B	3110JA1010B	Case,PCB	R	KR	GR-L207ER
502B	3111JA1008J	CASE ASSY,PWB	R	KR	GR-L207ER
505A	3J02447C	Fuse	R	KR	GR-L207ER
600A	5989JA1002A	Ice Maker Assembly,Kit	R	KR	GR-L207ER
601A	3390JA1078A	TRAY,ICE	R	KR	GR-L207ER
602A	4810JA1015A	Bracket,Ice Maker	R	KR	GR-L207ER
603A	3550JA3095A	Cover,Sensor	R	KR	GR-L207ER
603A	3550JA3095A	Cover,Sensor	R	MM	GR-L207ER
603B	5410JA3011A	Insulation,Rear	R	KR	GR-L207ER
603B	5410JA3011A	INSULATION,REAR	R	MM	GR-L207ER
604A	4510JA3003A	Lever,Ice Maker	R	KR	GR-L207ER
605A	5988JA1001B	Ice Maker,Unit	R	KR	GR-L207ER
606A	3551JA1031C	Cover Assembly,Motor	R	KR	GR-L207ER
607A	4930JA3037A	HOLDER,BRACKET	R	KR	GR-L207ER
607A	4930JA3037A	HOLDER,BRACKET	R	MM	GR-L207ER
607A	4930JA3037A	Holder,Bracket	R	TR	GR-L207ER
610A	5075JA1008B	BANK ASSEMBLY,ICE	R	KR	GR-L207ER
610A	5075JA1029E	Bucket Assembly,Ice		KR	GR-L207ER
611A	3550JA0026A	COVER,BANK ICE	R	KR	GR-L207ER
612A	4974JA2023A	Guide,Rail	R	KR	GR-L207ER
612B	4974JA2024A	Guide,Rail	R	KR	GR-L207ER
612C	4980JA2019B	Supporter,Gear Motor	R	KR	GR-L207ER
612C	4980JA2019B	Supporter,Gear Motor	R	WR	GR-L207ER
613A	4974JA3028A	Guide,Ice	R	KR	GR-L207ER
613A	4974JA3028A	GUIDE,ICE	R	MM	GR-L207ER
613A	4974JA3028A	Guide,Ice	R	TR	GR-L207ER
614A	6421JA3001B	SOLENOID ASSEMBLY	R	KR	GR-L207ER
615A	4838JA1004A	Tank,Water	R	KR	GR-L207ER
616A	1NZZJA3006A	Nut,Customized	R	KR	GR-L207ER
616B	5210JA3004L	TUBE,PE	R	KR	GR-L207ER
616C	5210JA3004A	Tube,Plastic	R	KR	GR-L207ER
616D	5210JA3005A	Tube,Plastic	R	KR	GR-L207ER
616D	5210JA3005A	Tube,Plastic	R	MM	GR-L207ER
616D	5210JA3005A	Tube,Plastic	R	TR	GR-L207ER
616E	5210JA3006C	TUBE,INJECT	R	KR	GR-L207ER
616F	5210JA3004H	Tube,Plastic	R	MM	GR-L207ER
616F	5210JA3004H	Tube,Plastic	R	KR	GR-L207ER
616F	5210JA3004H	Tube,Plastic	R	TR	GR-L207ER
616G	5210JA3005F	Tube,Plastic	R	KR	GR-L207ER
617A	5040JA3034A	RUBBER,CAP	R	KR	GR-L207ER
618A	4810JA3036A	BRACKET,COVER	R	KR	GR-L207ER
618A	4810JA3036A	Bracket,Cover	R	MM	GR-L207ER
619A	5221JA2005A	VALVE ASSY,WATER	R	KR	GR-L207ER
620A	1NZZJA3003A	NUT,DRAWING	R	KR	GR-L207ER
620B	1NZZJA3004A	NUT,DRAWING	R	KR	GR-L207ER
621B	4932JA3002A	CONNECTOR (MECH),TUBE	R	KR	GR-L207ER
622A	5040JA3025A	RUBBER,INJECT	R	KR	GR-L207ER
623A	4770JA3001A	Band	R	KR	GR-L207ER

623A	4770JA3001A	Band	R	MM	GR-L207ER
623B	4770JA3001B	Band	R	KR	GR-L207ER
624A	5231JA2002A	Filter Assembly,Head	R	KR	GR-L207ER
624A	5231JA2002A	Filter Assembly,Head	R	MM	GR-L207ER
624A	5231JA2002A	Filter Assembly,Head	R	TR	GR-L207ER
624B	5210JA3013A	Tube,Plastic	R	KR	GR-L207ER
624B	5210JA3013A	Tube,Plastic	R	TR	GR-L207ER
624B	5210JA3013B	Tube,Plastic		KR	GR-L207ER
624B	5210JA3013B	Tube,Plastic		TR	GR-L207ER
625A	3550JA2105A	COVER,TUBE	R	KR	GR-L207ER
626A	5231JA2004A	FILTER ASSY,HEAD	R	KR	GR-L207ER
626B	4932JA3009A	Connector,Tube	R	MM	GR-L207ER
626B	4932JA3009A	Connector,Tube	R	KR	GR-L207ER
626B	4932JA3009A	Connector,Tube	R	TR	GR-L207ER
626C	4932JA3009B	Connector,Tube	R	MM	GR-L207ER
626C	4932JA3009B	Connector,Tube	R	KR	GR-L207ER
626C	4932JA3009B	Connector,Tube	R	TR	GR-L207ER
627A	4930JA3054A	Holder,Pipe	R	KR	GR-L207ER
627A	4930JA3054A	Holder,Pipe	R	MM	GR-L207ER
627A	4930JA3054A	Holder,Pipe	R	TR	GR-L207ER
_____	3550JA1123A	Cover,Lamp	R	KR	GR-L207ER
_____	4987JA1022E	GASKET ASSY,DOOR	R	KR	GR-L207ER
_____	5221JA1001A	VALVE ASSY,WATER	R	KR	GR-L207ER